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Sewing Machine Improvements.

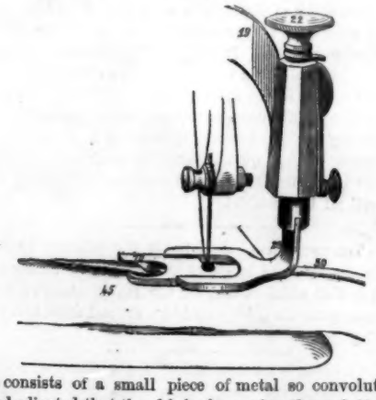
We give herewith an illustration of some important improvements added to the Wheeler and Wilson sewing machine. Though the radical operation of this machine has not been changed since its first introduction to the public, now nearly ten years, valuable attachments have from time to time been added. One of the more recent is the Corder, a simple attachment for laying cord on shirt bosoms, collars or on gentlemen's vests and coats and on ladies' clothing. It is laid and stitched without previous basting.

The Corder, marked 61 in the engraving, is attached to the cloth plate, 46, by the screws, 62 62, so that the end of the tube, 68, shall come in a line with the stitching. The cord, 67, is passed through the guides upon the Corder and through the tube, 68, far enough to hold. The fabric, 45, to be corded is placed so that the tube, 68, shall deliver the cord between the folds where the cord is to be laid, and the stitching is done as usual.

The engravings also represent the Glass Cloth Presser and the new mode of adjusting the hemmer. Ordinarily the Cloth Presser, 20, has been made entirely of metal. Recently this has been slotted and the slot filled with a piece of glass, 71, enabling the operator to watch the whole course of the seam during the process of stitching. But a moment is required to remove this piece of glass and substitute in its place the hemmer, 70, Fig. 2.

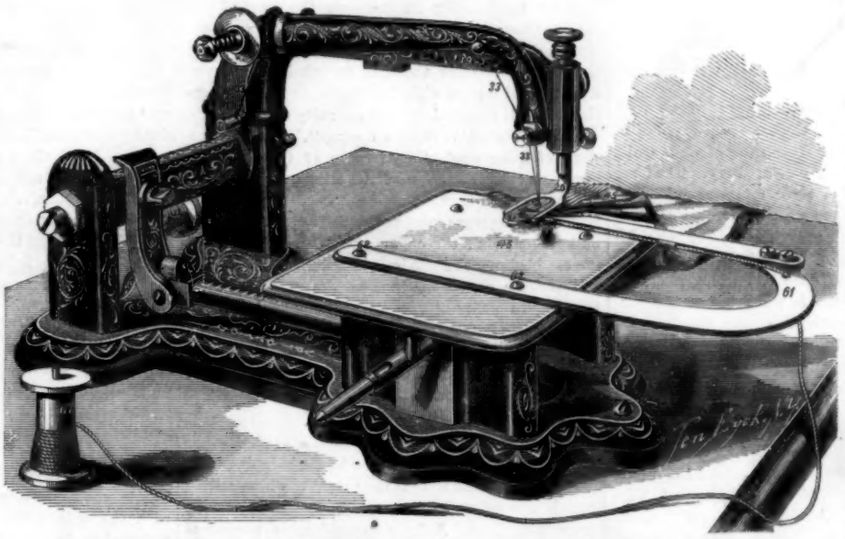
The hemmer is the most valuable attachment made to the sewing machine. It supersedes entirely the usual turning and basting for hemming and felling.

Fig. 2.



It consists of a small piece of metal so convoluted and adjusted that the fabric, in passing through it, is turned and beautifully stitched as in the ordinary process of sewing. Fells and hems of any width and of any curve are readily made and more beautifully than by the ordinary hand work.

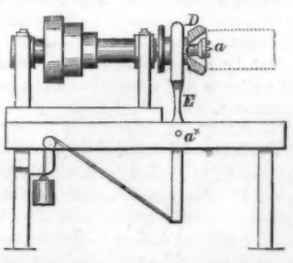
The improvement in the loop check and the recent arrangement for deadening even the slight noise of the machines show the disposition of the Wheeler & Wilson Company to give the public every advantage that mechanical ingenuity can suggest. The adaptation of the machine to heavy army clothing has been of great public benefit in our present emergency. It is estimated that twenty thousand of these machines are used in and about New York city alone. Their exportation has become an important item in our foreign trade. The American Minister at Jeddo, Japan, writes that the widow of the late Tycoon works one very successfully.



IMPROVEMENTS IN THE WHEELER AND WILSON SEWING MACHINE.

CENTERING CHUCK FOR LATHES.

In order to turn articles accurately in a lathe they must be properly centered. It is of prime importance that a lathe should be fitted with a centering device, called a chuck, for adjusting articles of different sizes. The accompanying figure represents a chuck, which is applied to a common lathe, and in which articles may be centered with facility. C represents the mandrel of the lathe, and on this is fitted the sliding sleeve, D, connected with the loaded lever, E, which moves it back and forth. The outer end of the chuck is flaring or funnel shaped, and is concentric with the mandrel and its central point, *a*, thus forming a convenient sliding chuck, by which articles can be quickly centered, and removed when turned. Patented by Elizabeth Keagg, widow of Samuel Keagg, Mineral Point, Pa., March 20, 1860.



REMARKS ON TEMPERING TOOLS.

In the last article upon this subject (page 403, Vol. V. new series), we invited communications of a practical character from those who had made or would make careful experiments in hardening and tempering steel. One correspondent who is a practical mechanic and acquainted with tempering, has already written to us upon the subject. He says:—"By experience I have learned that the hardness of steel is due to the rapidity with which it is cooled. In cooling a piece of steel its size and its temperature must be taken into consideration, and the water or oil bath must be made up to suit the article. The steel face of an anvil can scarcely be made too hard; it therefore requires to be very suddenly cooled. A bath of salt water cools steel more rapidly than any other; fresh water is second to salt water. Oil and resin mixtures are made up to modify the time of cooling steel articles according to their size and the purposes for which they are intended. With the tempering of saws I am but little acquainted, but the following I give upon personal experience. A thin steel instrument, such as a lancet, should be heated to a cherry-red color, then plunged into oil having a temperature of 60° Fah. After this it is drawn (tempered) in the fire until it assumes a dark yellow color. Penknives I treat like lancets, but draw the color to a light blue. Razors I treat like lancets, but plunge them into cold water at 60° Fah.; the temper is drawn to a light blue color. Table knives are plunged in oil; the hardness is more drawn out than that for penknives; when they become black they are immediately cooled. Chisels and small tools for cutting wood I plunge in water like razors; but those of the largest size I plunge in oil at 60°. Those of small size I draw to a dark yellow color. Light springs I immerse, like lancets, in oil, then hold them over a flame, when the oil takes fire. I draw out the hardness until they become black. I harden large springs by plunging them in water at blood heat (100° Fah.), then oil them and blaze the oil until they become black. It requires experience to enable a person to temper a spring properly, because the color is not a guide for it. Baths of sand and molten metal are used for tempering springs where great quantities are made. Swords receive a spring temper. Springs, swords and other articles are polished after tempering, and are subsequently heated until they assume any desired color."

There is quite a variety of opinions among tool makers respecting the colors given to various tools, as representative of their temper. This may be owing in a great measure to the different ability which persons possess in distinguishing colors. We have known persons who were unable to distinguish the difference between a purple and blue color.

NOTES ON MILITARY AND NAVAL AFFAIRS.

Gen. Pope seems to be achieving great success among the rebels in Missouri. He has recently come into collision with the secessionists at Shawnee Mound, and scattered them, 2,200 strong, in every direction, taking 150 prisoners, tents, baggage, horses, &c. Part of his forces under Col. Jeff C. Davis surprised another camp of secessionists on the 18th near Milford a little north of Warrensburg, and after a brisk skirmish the latter surrendered, 1,300 prisoners were taken, including 3 colonels and 17 captains, and 1,000 stand of arms, 1,000 horses, 65 wagons and a large quantity of tents, baggage and supplies. Information reached Gen. Halleck that the Union troops had taken two tuns of powder in kegs buried on Claib Jackson's farm, which effectually cut off their supply of ammunition.

Gen. John Pope is a man about forty years of age, a native of Kentucky, and a graduate of West Point, which academy he entered in the year 1838. He graduated in 1842, and was appointed to the army from the State of Illinois, entering that service as a Brevet-Second Lieutenant of Topographical Engineers. He was engaged in Mexico, and was breveted a First Lieutenant for gallant and meritorious conduct in several conflicts at Monterey—the brevet bearing date from September 23, 1846. On the 23d of February, 1847, he was breveted Captain for gallant and meritorious conduct in the battle of Buena Vista. On the 1st of July, 1856, he took the actual rank of Captain in the Corps of Topographical Engineers, and on the 17th of May, 1861, was made a Brigadier General of Vounteers.

On the 20th December a sharp engagement took place between a portion of Gen. McCalls division of the army of the Potomac, consisting of Gen. Ord's brigade and Easton battery of artillery. The force of the enemy consisted of three regiments of infantry, a cavalry regiment and a battery under command of Gen. Forney of Alabama. The enemy was defeated and fled in the direction of Fairfax Court House, leaving a large number of dead and wounded on the field. The scene in the woods presented all the horrors of a sanguinary battle field, and the dead and dying lying strewn in various directions. Forty dead bodies of the secessionists were picked up, and fifteen wounded prisoners were taken and placed in houses in Drainesville. Gen. Ord captured eight wounded prisoners and two caissons with ammunition. In their haste the enemy left behind arms of all descriptions, clothing, &c. Their loss is estimated at 150 killed and wounded. Among their killed was Col. Tom Taylor, of Frankfort, Ky., and commander of the First Kentucky regiment of secessionsts. The Union loss was small.

EXTRACTS FROM McCLELLAN'S REPORT ON THE ARMIES OF EUROPE.

BUYING HORSES FOR THE FRENCH CAVALRY.

Horses are purchased at from 4 to 7 years of age, and must be of French origin. The animal is brought to the commandant of the remount depot, and submitted to his inspection, without any price being named. If the commandant finds him unsuitable, he is at once rejected; if the contrary is the case, he is brought before all the officers of the depot for a thorough examination. Each officer then writes his estimate of the value of the animal on a slip of paper; these papers are placed in a hat and shaken up, so that the estimate of each officer may not be known; the mean of these estimates is then taken, and the commandant offers that price for the animal. If the owner accepts the offer, the price is paid at once; if he refuses, the horse is at once sent away, for no bargaining is allowed.

MARRIAGE IN THE AUSTRIAN INFANTRY.

As a general rule, the men are not permitted to marry; but a certain number of laundresses are allowed each company. Under no pretext can more than one-sixth of the officers of any regiment or special corps be married. When any officer desires to marry, he makes an application, and receives permission in his turn when the first vacancy occurs, irrespective of rank. Before he is permitted to marry, an officer must deposit in the hands of the government a certain sum, different for the various grades and corps. He receives the legal interest of this money every month. Privates are placed on courts martial for the trial of their peers. Not more than 100 blows can be given; the usual manner of inflicting them is on the seat, the pants being kept on. Flogging is rarely resorted to, and only with hardened characters and for heinous offences. For desertion, the penalty is flogging for the 1st and 2d offences, death for the 3d. An officer on detachment has great powers in regard to the infliction of punishment.

EARTH WORKS AND PERMANENT FORTIFICATIONS.

This would seem to be the proper place to notice a popular fallacy which, for a time at least, gained extensive credence. It was, that the siege of Sebastopol proved the superiority of temporary (earthen) fortifications over those of a permanent nature. It is easy to show that it proved nothing of the kind, but that it only proved that temporary works in the hands of a brave and skillful garrison are susceptible of a longer defence than was generally supposed. They were attacked as field works never were before, and were defended as field works never had been defended. The main difference between properly-constructed permanent fortifications (intended to resist a siege) and temporary works is, that the latter seldom present an insuperable obstacle against assault, while the former always do. In addition, permanent works have a better command over the adjacent country, and are more carefully and pertectly planned. The masonry walls, which render an assault impossible, cannot be seen from the distance, and can be destroyed only by establishing batteries on the crest of the glacis or the edge of the ditch; the earthen parapets alone being visible beyond that point, they may, until the besiegers arrive there, be regarded in the same light as field works, with the difference that the garrison are not harassed by the necessity of being constantly prepared to repel an assault. Now, in the siege of Sebastopol, the trenches of the besiegers never reached the edge of the ditch; so that, had the fortification been a permanent one, the most difficult, and dangerous part of the siege remained to be undertaken, viz., the crowning of the covered way, the establishment of the breach batteries, the descent and passage of the ditch, and the assault of the breach. In other words, at the moment when the weakness of the temporary works became apparent and fatal, the true strength of the permanent defences would have commenced coming into play.

SCREW PROPELLERS.

The most remarkable feature in the shipping business at the present time is the extent to which sailing vessels are being superseded by vessels driven by screw propellers. Already a considerable portion of the merchandise which is transported from one port to another on our seaboard is carried in these vessels.

The marked advantages which steamers possess over sail vessels, are the rapidity and regularity of their passages, and the large amount of work which a vessel of a given size will perform in the course of a year in consequence of the greater number of its trips. The great disadvantage is the expense of steam; wind costing absolutely nothing.

By the notes on shipbuilding on another page it will be seen that nearly all the vessels which are now being built in our ship yards are propellers; one very fine vessel of this class being in process of construction for the China trade. For vessels of very light draft of water propellers are not suitable; and the government has contracted for a few gunboats to be propelled by sidewheels. In the "notes" will be found a minute description of one of these boats and its machinery.

How to Pack Fruit.

The following is the method of packing fruit and flowers employed by Mr. Kidd, the gardener of the Marquis of Breadalbane, in England. He says:—"A box is chosen, in size, according to the quantity to be sent. A layer of dry bran is put at the bottom; then each bunch of grapes is held over the center of a sheet of soft paper; the four corners of the paper are brought up to the stalk and nicely secured; then laid on its side in the box, and so on, until the first layer is finished. Then fill the whole over with bran, and give the box a gentle shake as you proceed. Begin the seond layer as the first, and so on until the box is completed. Thus, with neat hands, the bloom is preserved, and may be sent to any distance; but, with clumsy hands, quite the contrary, and often an entire failure, as the putting in and taking out of the box are the most imporant points to be observed."

He has pursued this system of packing fruit for twenty years, and it was sent five hundred miles by inland carriage from England to the highlands. He has invariably, packed sixty or eighty bunches of grapes, and fifty or sixty dozen of peaches or apricots in one box, and they arrived as safe and fresh as when taken from the trees.

Efficiency of Rifled Cannon.

Col. Brown, commander at Fort Pickens, in his report of the attack upon the rebel batteries, states that he has come to the conclusion that the brick or stone walls of batteries, at a distance of 2,000 yards, cannot be seriously injured by the most efficient smooth-bore guns. He also states that shells are not to be depended upon for firing wooden buildings unless they are filled with some inflammable composition. He also says that small gunboats, drawing six feet water and armed with rifled guns, are of more service than a forty-gun ship, and that Parrott's rifled gun is much better than James's. The moment the rebels at Fort McRea got their rifled guns to bear upon the *Richmond* she had to abandon the contest or be cut to pieces. If she had been supplied with the same kind of ordnance she would have done much more mischief.

IMPORTANCE OF GOOD QUALITY OF IRON FOR SHIPS.—We find the following statement in the London *Engineer*:—In consequence of the inferior description of iron supplied at Chatham Dockyard for the *Achilles*, 50, by the various firms under contract to the Admiralty, and the difficulty experienced in obtaining adequate supplies of plate and angle iron for the prosecution of the works in connection with the building of that frigate, the Admiralty have entered into a contract with the well-known firm of Mares & Co., who have undertaken to furnish whatever plate iron may be required at Chatham. The first deliveries of iron from Messrs. Mares's firm have been made at Chatham Dockyard, and the whole of that supplied up to this time is of very excellent quality. The delay in building the *Achilles* has arisen solely from the difficuly experienced in obtaining iron of prime quality. This, however, has now been got over, and the work on the *Achilles* will be proceeded with rapidly.

THE Chicago *Times* says the workmen in the machine shops of McCormick's Reaper Manufactory are at work on a reaper for the great exhibition at London next year. It will be a magnificent machine, costing probably a thousand or two of dollars. There are wheels in the machine which will cost from twenty-five to fifty dollars, merely for the purpose of producing a bright surface. The wood work will be of a corresponding quality, and the machine will probably be the finest ever manufactured. The iron work will all be polished.

THE porous cups used in all the galvanic batteries in America are made at the pottery in Jersey City. The flint which is used for the manufacture of American porcelain is imported in a ground condition from England.

COAL OIL is a better article for preserving sodium and potassium than naphtha. In coal oil, sodium keeps its luster for months or years, while in the purest naphtha it is dimmed in a few days.

HAIR CLOTH.—Isaac L. Hoard, of Providence, R. I., wishes to obtain the address of manufacturers of hair cloth in New York, Pennsylvania and New Jersey.

Old-Fashioned Comforts.

Our ancestors were a frugal, self-denying people, inured to hardship from the cradle; they were content to be without almost all the luxuries of life, but they enjoyed some of its comforts, to which many of us are strangers (old-fashioned comforts, we may say); and among these, the old fireplace, as it used to be termed, held no mean rank. How vividly the picture of one of those spacious kitchens of the olden times comes to our mind, with its plain furniture and sanded floor, innocent of paint, but as white as the neatest of housewives could make it! In one corner stood the clock, its very face wearing an aspect of good cheer, and seeming to smile benignantly upon a miniature moon over its head, which, tradition said, had, at a remote period, followed the rising and setting of its great prototype in the heavens, though its days of active service were long ago over.

But the crowning glory of that kitchen was not its white sanded floor; nor the high desk, with its pigeon holes and secret drawers, which no venturesome youngster ever dared invade; nor yet the old clock, ticking so musically in the corner; but it was the old-fashioned fire-place, with its blazing embers, huge back-logs, and iron fire-dogs, that shed a glory over the whole room, gilded the plain and homely furnitnre with its bright light, and rendered the place a type of true New England homes in "y olden time."

Never were there such apples as those which swung round and round upon strings before the bright fire of a winter's evening, never such baked potatoes as those buried deep in the ashes upon the hearth, never such cornstalks as those which caught a golden hue from the blazing embers, or turkeys like those turned upon a spit, filling the room with savory odors so suggestive of a dainty repast.

Before the fire was the wooden settle, and here the children were wont to sit in the long evening, telling stories, cracking nuts, conning their lessons for the morrow, or listening in silence to the words of wisdom that fell from the lips of their superiors, and anon gazing in silence into the bright fire, and conjuring up all sorts of grotesque fanciful images from among the burning coals. No fabled genii, with their magic lamps of enchantment, could build such gorgeous palaces, or create such gems as the child could discern amid the blazing embers of the old-fashioned fire-place.

And we must not neglect the chimney corner, where sat our grandfather in his accustomed seat, his hair silvered with the snows of many winters—a venerable man, to whom old age had come "frostily but kindly," and whose last days were like those of an Indian summer, serene and beautiful, even till the stars appeared in heaven.

How pure was the air in those days! The huge fire-place, with its brisk draught, carried off the impurities of the atmosphere, and left the air pure, life-giving and healthful. Now, we crouch around hot cooking-stoves, and think it strange that we feel so stupid and drowsy of an evening; or we huddle about air-tight stoves, and wonder that the air seems burn-and impure; or we sit down in chilly rooms heated by a furnace, and marvel that with all our costly furniture, soft carpets, bright mirrors, and damask curt tains, they are cheerless places—so unlike our ideas of a New England home.

Alas! that with all the so-called improvements of our advanced civilization, the fire should be permitted to go out forever in our old-fashioned fire-places, thus burying in the ashes of the past so many means of health, home-comfort, good-cheer and happiness.

Light and Heavy Railway Trains.

The following interesting and important article on the above subjects is taken from the Chicago *Times*:—

A well-known and justly celebrated railroad man of this city favors us with his own experience as to the relative advantages of light and heavy trains. This is a subject which should merit the attention of railway managers generally, as entering largely into the economy of operating roads, and we hope to receive communications from other sources touching it. He says: "I commenced railroad life about twenty-seven years ago, on a road extending some forty-four miles into the country from one of our Atlantic cities. At this time all tracks were laid with light rail, and engines and cars were also light as compared with those now in use—the engines weighing from 5½ to 7½ tuns, and the cars, passengers and freight, say 2½ tuns. The passenger coaches would accommodate comfortably thirty persons, and the freight cars would carry about one-half the tunnage of a modern eight-wheelod car. The road referred to continued to increase its business, as did other roads built at that time, and, as the traffic became greater, the carrying capacity and weight of engines and cars also increased, until finally the heavy machinery now in use was substituted. A first-class passenger engine of the present time will weigh from 25 to 30 tuns, with tender in proportion. The passenger coaches will now carry say sixty persons, and their average weight is twelve tuns, being an increase over the light cars of 140 per cent in the ratio of capacity for passengers. The freight cars now in general use weigh about 65 per cent more, on the same carrying capacity, than the light cars of twenty-five years ago."

To demonstrate the facts and figures set forth in the foregoing, let us see what the cost of transporting this excess of weight, over the 31,000 miles of railroads in the United States, amounts to annually. To do this it is assumed that every mile of road has at this time an average of seven trains passing over it each day (which is below the real fact), and that each passenger-train engine carries with it one baggage and two passenger cars, and the freight engines fifteen cars in each train. Taking this basis, we find an excess of weight per train, in the same amount of freight carried, of more than forty-five tuns, which at a cost of one-half cent per tun per mile for transportation, amounts to an aggregate of over fifteen millions of dollars yearly.

In connection with these figures, and to show practically what is now being done, we may state that the Pittsburgh, Fort Wayne and Chicago Railway have three "locomotive cars" now successfully running in the passenger traffic—these combine the locomotive and passenger coach. One of them, during five months ending with September 30, ran 12,008 miles at a total cost, for repairs, fuel, stores, and train service, of $1,328 45—an average of only 11.06 cents. per mile run. Another of them is employed as a paymaster's carriage, and the third has recently been placed in the passenger traffic.

It has been observed by railroad men that the ordinary repairs of track and superstructure is about the same per mile run by train as the repairs of the train, including engine and cars, are per mile run. If such is the case, we would suggest that officers of Western roads may find it conducive to the interests of their stockholders to give this whole subject a thorough investigation; as in doing so they may find that a change of present policy will tend to help the stock or main lines and branches located through thinly settled portions of the country, or add something to the net earnings of roads whose gross receipts cannot be increased sufficiently to sustain the present machinery used and meet the maturing interest on bonds.

How to Kill Ground Moles.—The New York *Observer* in reply to a correspondent who wished to know how to eradicate ground moles, gives the following as an effectual remedy:—"Take each ground mole, and with a sharp hatchet cut off his head just between his ears and his fore legs; then take the body and skin it, and preserving the skin for the sake of the fur, throw the remainder to the pigs, and you will have effectually eradicated all the moles from your garden. The same, or a similar rule, is recommended to prevent mosquitoes from biting. Take each one of them between your thumb and finger, squeeze them severely until they protrude their biters; extract these carefully with the thumb and finger of the other hand, and then drop the insect. He will never bite any more."

Eggs in the Winter.—It is perfectly feasible to keep the hens laying all winter. Give them animal food to supply the place of insects they catch in the summer, and then let them have a warm place to run into, with plenty of water. A frequent taste of green food, such as cabbage-leaves, potatoes, &c., and some gravel and chalk, or better broken oyster shells to aid the formation of their shells, and the birds will repay all the care and food, in nice plump eggs, no matter what the particular breed may be.

A Man Guarding $3,000,000 Worth of Diamonds.

The most profound adamantologist in the world is the Duke of Brunswick. He has in his possession $3,000,000 worth of diamonds. He has just published a catalogue of his diamonds, and in the appendix there is a notice of the most celebrated diamonds in the world. This catalogue numbers not less than 268 quarto pages. It gives with great detail, a list of his diamonds. It relates how this once adorned a Turkish saber, that a royal diadem, another an imperial collar, a fourth a Grand Electoral hat; this black diamond was an idol's eye, that brilliant rosy diamond was taken from the Emperor Baber, at Agra, (it weighs 81 carats, and is worth $80,000) those were the waistcoat buttons of the Emperor Don Pedro, this diamond ring with the Stuart coat of arms and the cypher M. S., belonged to Mary Queen of Scotts; that pair of carrings hung once on Marie Antoinette. He has plenty of diamonds worth $20,000, $30,000, and $45,000; two worth $60,000 each, one $70,000 and $80,000. He is in treaty for two diamonds, one of which is worth $232,000, and the other $650,000.

The Duke of Brunswick dares not leave Paris at any period of the year; his diamonds keep him chained there. He dares not sleep from home (some folks reckon this liberty of pillow one of the great franchises of Paris) a single night. Then he lives in a house constructed not so much for comfort as security. It is burglar proof; surrounded on every side by a high wall; the wall itself is surmounted by a lofty iron railing, defended by innumerable sharp spear heads, which are so contrived that if any person touches one of them a chime of bells begins instantly to ring an alarm; this iron railing cost him $14,127. He keeps his diamonds in a safe, built in a thick wall; his bed is placed against it, that no burglar may break into it without killing or at least waking him, and that he may amuse himself without leaving his bed. The safe is lined with granite and with iron; if it is opened by violence a discharge of firearms which will inevitably kill the burglar takes place and at the same time a chime of bells in every room in the house is set ringing. He has but one window in his bedroom; the sash is of the stoutest iron, and cannot be entered unless one be master of the secret combination of the lock. A case of a dozen six-barreled revolvers, loaded and capped, lies upon a table within reach of his bed. Would you like to be in his place?

Comparative Size of the Planets.

Some notion may be obtained of the comparative size of the principal objects in the solar system, by supposing a globe of two feet in diameter placed in the center of a plain, to represent the sun; a grain of mustard seed, placed at a distance of eighty-two feet represents Mercury; a pea at the distance of 142 feet would give a representation of Venus; another pea, not perceptibly larger, at a distance of 215 feet, would represent the earth. Mars is less dignified still for a pin's head placed at a distance of 627 feet would afford a true representation of its comparative size and four minute grains of sand, at a distance of 500 feet, would convey some perception of the position and size of Vesta, Pallas and Juno. A moderate sized orange at a quarter of a mile would represent Jupiter; a smaller orange, at nearly half a mile, would represent Saturn; and the far-off planet Herschel dwindles into a cherry, moving at a distance of three-quarters of a mile from the central globe representing the Sun.

Alcohol will wash out stains of oil, wax, resin and pitchy or resinous substances; so will spirits of turpentine, and generally without injury to colors. The turpentine may afterward be removed with alcohol, as it is liable to leave a slight stain. Common burning fluid, which is a mixture of alcohol and turpentine (or camphene), is an excellent solvent of oil, wax, tar, resin, &c., and it soon dries off after use.

Quantity of Food for Oxen.—Frequent observations have shown that an ox will consume two per cent of his weight of hay per day to maintain his condition. If put to moderate labor, an increase of this quantity to three per cent will enable him to perform his work, and still maintain his flesh. If he is to be fatted, he requires about four and a half per cent of his weight daily in nutritious food.

THE GEOLOGICAL HISTORY OF NORTH AMERICA.

BY DR. STEVENS.

Seventh Lecture.

In the regular sequence of the course marked out for these lectures the Human Epoch would follow the mammalian and be the especial subject for the evening. In order to clearly understand how the human era was ushered in, we must go back and trace the history of our mountain systems and continental upheavals—for the earth's history can be traced by its mountains as well as by its rocks, inscribed with biological characters. Indeed the dynamics of the globe form one of its most profound and interesting chapters.

There are many theories for the elevation of mountains. We select the one of M. E. Beaumont, modified by Prof. Dana, for the elucidation of our subject. According to Beaumont, mountains of elevation are caused by a collapse of a portion of the earth's surface crust upon its cooling, and therefore contracting interior.

It is manifest that, upon the supposition of the earth at one stage of its history having been a cooling mass of molten matter, that the first crust formed would necessarily be a thin one, when compared with the main bulk of the globe. Any portion of this crust circling the entire mass, falling in upon the cooling center of the sphere would of necessity force up a corresponding portion of the cooled crust contiguous to the fracture, and hence we should have corresponding ridges landward, caused by lateral pressure, and the valleys or depression of collapse, if water was upon the planet, would be filled with the same. Thus, opposed to every great system of mountains there would be corresponding systems of valleys or seas.

Upon the North American continent the first mountains elevated are the Capotian range of Labrador, running nearly east and west, and extending from the eastward across Labrador into Canada, throwing off a spur southwest to the head of Lake Superior and by the Lake of the Woods to the sources of the Mississippi, while another spur extended northwest to the Arctic seas. The force elevating these mountains and the primitive continent was exerted from the north; it came in from the Arctic seas, from Hudson's Bay, and formed the land lying between these two bodies of water, as well as that of Labrador and the whole of the northern portion of Canada. The depression of Lake Superior may have been caused at the same time, while the country immediately south of it, partly felt the elevating force. The Adirondack Mountains, the Ozark and Iron Mountains, the Black Hills, are of this age, as outliers of the great system.

The second great elevating force was exerted from the Atlantic, giving us the eastern fold of the great Appalachian range, extending from Canada to Alabama, more than fifteen hundred miles, corrugating the earth into folds which we now call the Katahdin Mountains of Maine, White Mountains of New Hampshire, Green Mountains of Vermont, Taconic Mountains of Massachusetts, Highlands of New York, South Mountains of New Jersey and Pennsylvania, Blue Ridge of Virginia, Iron and Smoky Mountains of North Carolina and Unaka of Tennessee, with broad continental areas of 30 to 200 miles in width, extending eastward to the Atlantic ocean and far under its waters to the inner edge of the Gulf stream. This force was exerted after the primitive rocks were formed, and during the laying down of the Silurian and Devonian.

The third great system seems but to have been a continuation or a resumption of the second after a long pause, sufficiently long for the completion of the subcarboniferous and carboniferous system of rocks. This force elevated the Alleghany or Appalachian system into three great folds, with intermediate valleys, and with an extended plateau inland extending from Canada to Tennessee westward of the mountains and far out toward the Mississippi and Missouri rivers.

The fourth system was that of the Rocky Mountains where the force was exerted from the Pacific ocean, elevating all the mountain ranges extending in a northwest and southeast direction from the north of the continent into New Mexico, and perhaps Central America. This system was after the permian and cretaceous.

The fifth great system is that of the Sierra Nevada, Humboldt and other mountains running north and south, which was also caused by the Pacific force, subsequent to the chalk, the eocene, and miocene of the tertiary age.

The sixth great system is but a continuation of the latter, giving the Coast range of the Pacific, which seems to have been at the close of the tertiary or after the pliocene and perhaps post-pliocene. These latter systems gave us the continent west of the sources of the Missouri to the Pacific.

Subsequent to this age there followed a subsidence of the eastern portion of the continent from the mouth of the Yellow Stone river to the Atlantic, when the continent was depressed beneath its present level at least 2,624 feet, and perhaps 1,000 feet more, for certain it is that mountains of this hight bear unmistakable evidence of having been worn by water, grooved and scratched by icebergs, floating ice or other causes, and have resting upon their summits rocks evidently brought from some other source, and that source always lying far to the north.

It was during this depression of the United States that occurred all the phenomena of the drift, so called. These consist of the grooving, striating, smoothing of rocks—the gulleying out of submarine valleys—the transportation of large masses of rocks—the accumulation of beds of sand and gravel under the leeward side of hills and mountains, called osars and ridges, lake and sea shores, and the spreading over the surface generally of a bed of comminuted matter, clay, gravel and sands of from a few feet to 200 feet in thickness.

During the continuance of this depression the continent subject to it was washed by the waters of the Arctic ocean, for all the animals and plants indicate a boreal origin. The waves of this mighty deluge swept the face of the country of those enormous animals described in my last lecture, and buried them in the cold waves of the Arctic Ocean. It wiped out the past and prepared for the new, for the old had become effete. It no longer subserved the grand purposes in the sublime economy of progress. A new earth was to arise from the bosom of the waters, to be clothed with new forests, its plains with new verdure. A new creation of animals were to roam its woods, to feed upon its pastures; new birds to skim the air; new fish to swim the seas, and finally man to enjoy the whole.

The seventh and last upheaval brought the northern hemisphere up from the bottom of the waters for the last time. It was a return to the first elevating force, coming in from the Arctic Ocean and Baffin's Bay, elevating the depressed portion from beneath the waters, and giving out land.

Man, the microcosm of the whole created kingdoms of nature, pursuing his investigations, finds on the mountain hights evidence of a flowing ocean, hidden in the valleys submarine ridges and sea beaches far out in the prairies, frowning cliffs, furrowed and water torn, long narrow ravines worn out of the solid rock, which are the ancient fiords of the coast; buried timber and bones, which indicate somber evergreen forests, with the muskox and raindeer of northern latitudes. From these relics of the past, by the laws of comparative anatomy, the strictest rules of analogy and the profound deductions of philosophy, with unerring certainty he lifts the curtain of mist which covered the cradle of his race, when the "earth was without form and void, and darkness was upon the deep."

Phosphorescence.

In *Poggendorff's Annelen*, it is stated that the experiments of M. De Reichenbach tend to prove that phosphorescence is a usual consequence of all molecular phenomena, and not the result of combustion or oxidation. Mr. Phipson proved this last point some time ago, when he showed that dead fishes shine in the dark, even under water, and in the absence of oxygen. According to M. De Reichenbach there is phosphorescence during fermentation or putrefaction, crystallization, evaporation, condensation of vapors, the production of sound (vibrations therefore), and the fusion of ice; a considerable glow is remarked when a galvanic pile in activity, a block of ice in fusion, or a solution of sulphate of soda in the act of crystallizing is observed in the dark.

The human body itself is not devoid of phosphorescence; in a healthy state it emits a yellow glow; when in ill health the glow becomes red. The author considers that this observation may possibly be of use in diagnosis. To perceive these phenomena the eye ought to have been previously rendered sensitive by remaining some hours in perfect darkness, and even then all eyes are not equally impressionable. But, if several persons unite in performing the experiment together, there will always be a certain number who are able to see phenomena. According to many observations, it would appear that every molecular movement is accompanied with a disengagement of electricity.

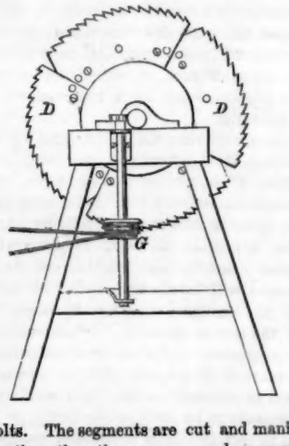
MARSDEN & BURRELL'S CAMP CANDLESTICK.

Among the numerous contrivances for the convenience and comfort of the soldiers is the camp candlestick illustrated in the annexed cut. It is simply a socket for the candle cast upon a wrought or malleable iron spike, by which it may be fastened upon a stump, table or other piece of wood, its merit consisting in its cheapness, simplicity and convenience. The spike has a screw thread cut upon it, beginning a short distance from the point, for fastening it to wood which would not otherwise hold. The spike may be bent at right angles to one side for fastening the candle stick to a tent pole, tree or othe vertical support. When the candl is burned down to the socket, th candlestick may be inverted and the remnant of the candle stuck upon the spike until it is consumed, the cup serving as a base.

The patent for this invention was granted to S. L. Marsden and S. R. Burrell through the Scientific American Patent Agency, Nov. 26, 1861, and further information in relation to it may be obtained by addressing S. R. Burrell, hardware dealer, at 71 Broad street, New York.

SEGMENTAL CIRCULAR SAWS.

Common circular saws are made out of single plates of steel, which are very costly, and difficult to handle when of large size. The annexed figure represents a circular saw, composed of segments of steel plates, D D, secured to a backing plate and central flange by



screw bolts. The segments are cut and manipulated to fit together, then they are secured as represented, forming a built circular saw. A saw made of a single plate, when it becomes heated in sawing hard wood, is liable to buckle, but a saw made of segments, it is said, will expand, when heated, without buckling. Very large circular saws can be constructed in the manner represented out of plates of moderate size. Patented by R. K. Hawley, March 27, 1860.

NOVEL LIGHT LOCOMOTIVE.—The Dunkirk, N. Y., *Herald* says:—"We saw in the depot one day last week an engine which seemed to be a novelty even to railroad men. It was the coal-burner *Hackensack*, a miniature specimen of a locomotive and tender combined. It has but one driving wheel on a side, and is capable of running forty-five or fifty miles an hour, with a light train of course. It belongs to the New York and Erie Railroad, was built, we believe, by the engineer, Mr. Mumford, and is used by Superintendent Minot in going over the road in the performance of his duties."

Correspondence

Expansion of Steam.

MESSRS. EDITORS:—In your issue of the 7th December, your correspondent, Mr. West, referring to a paper in the *Franklin Journal*, which protests against the conclusions of the naval engineer Board at Erie, wishes to know whether it is better to do a given amount of work with a small cylinder under full steam travel, or with a larger cylinder under expansion.

My object in making a review of the Erie experiments, was by no means controversial. If I had the disposition, I should lack the time to spin out endless reiterations of the old story that "twice two are four." I deemed it necessary that some one in the profession for the honor of the calling, should file a protest against an erroneous statement, which went forth under the seal of official dignity, and might result in injury to some who respect all authorities in print, and are obliged to take many things on faith. Beyond this, I have no special interest in the matter, having not only a perfect reliance on the theory of expansion, but the corollary of a very important and severe school of practical applications which leaves no room for any hesitancy of opinion.

The case which Mr. West presents is one which can be settled without recourse to argument at length, and without much latitude for discussion. The relative benefits at issue may be summed up very briefly. The question hinges on the comparative economy of a cylinder 14 inches in diameter, traveling full stroke under 50 pounds pressure, 300 feet per minute, and a cylinder of 22½ inches diameter, using one-fifth cut-off with the same initial pressure.

In the first case there are 1.0775 square feet under 50 pounds pressure, traveling 300 feet per minute, and using therefore, exclusive of clearance, &c., 322.25 cubic feet of steam per minute.

In the second case, if the full benefit of the Mariotte law is realized, we have 2.7632 square feet under a mean pressure of 19.43 pounds at the same speed, doing the same work with 165.79 cubic feet of steam at 50 pounds, being a saving of over 48 per cent. If we assume here, as we do, the same steam pressure at the cylinder, all the losses in the boiler and between the boiler and steam chest, are common to either cylinder, except that the more slow use of steam for the same work, as well as its reduced consumption, is a direct and important gain for expansion, at the boiler.

As the larger cylinder will have larger valve openings, two important advantages are obtained in the valve chest. First, the friction of steam induction will be much reduced over that of the same quantity of steam entering the smaller cylinder, and will, of course, aggregate its losses in proportion also to the total quantities used; and second, the relative back-pressure will for similar reasons be largely in favor of the smallest quantity of steam educted through the largest opening. When we find that small high-pressure cylinders sometimes register a back pressure of 40 per cent, this becomes a very serious item in practice. As the friction of an engine chiefly depends on its load and velocity, it will be common to both cylinders in this case, except it may appear in practice that the smaller piston has less friction than the larger. It is not at all certain that this will occur, since this item depends very much on nice mechanical adjustment, in which the advantages favor the largest piston; but granting that practice and theory agree, the relative percentage of difference, as compared with the total engine friction, is necessarily small. Large pistons are very seldom troublesome; small pistons are otherwise, as a general rule.

In losses at the clearances, the advantage is with the smallest cylinder. The difference, however, is not formidable in its percentage, and is modified by the expansion of the clearance steam. The Erie Board has asserted, but has totally failed to demonstrate, that the loss by condensation in the cylinder, is much greater under expansion, than under full steam. Other engineers, at least equally competent to judge, have proved by experiment a gain as to this item when expanding, and it is certain that the valve leakage both at the steam and exhaust ports, which varies with the differences in pressure, and is much greater at the exhaust under full steam travel than under expansion, largely outweighs all the speculative objections to the expanded steam.

In brief, then, in using the larger cylinder we have these results:—A gain in making steam, in the friction and back pressure of valve ports, and in valve leakage, to be added to a direct saving of 48 per cent of steam, from which the probable deductions are for differences of piston friction for the additional clearances and assumed extra loss by condensations.

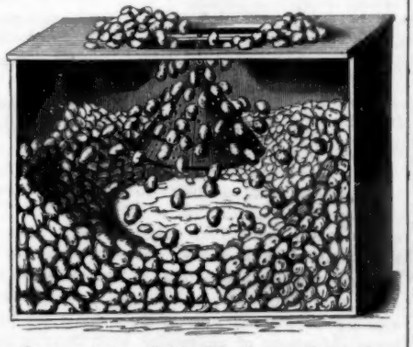
There can be no question then, that on assumed sizes of this kind, the plain, palpable conclusion is directly in favor of expansion. But in this examination we are treating the subject as if it were not a mechanical absurdity for any engineer to run his cylinder under full steam.

There is no space here on this point to say anything more than this:—That inasmuch as every engine in motion reaches a point in every stroke of the piston, where the fly-wheel or counterweight or paddle-wheel, is so charged with power as to carry the piston through the balance of its travel, it is a piece of sheer ignorance and folly to keep up a pressure which exercises no full impulse, after the moving parts control the piston. In other words, after any engine has attained its uniform speed, the idea of full steam travel which presupposes an entire absence of mass in motion, is theoretically and practically absurd. SAMUEL MCELROY.

New York, Dec. 24, 1861

How to Store a Large Quantity of Potatoes.

MESSRS. EDITORS:—I noticed in a recent issue of the SCIENTIFIC AMERICAN some remarks about storing potatoes. These put me in remembrance of some practical experience which I had with storing potatoes in the northern part of New York. I was interested in the manufacture of potato starch, and we were using about 400 bushels per day. We used to dump the potatoes in a heap of 8,000 bushels through a scuttle, and before we could use them all up they would heat at the middle and decay rapidly. I judged this was owing to the earth or dirt on the potatoes, and I therefore devised and put in operation the plan represented by the annexed figure, which proved quite successful.



I made a cone of rough boards and suspended it about two feet from and directly under the scuttle. When the potatoes were dumped in the scuttle the dirt was rubbed off the potatoes, thrown outward and distributed around from the center, while the clean potatoes rolled to the middle. This simple device enabled us to store from twenty to thirty thousand bushels with perfect safety, and it was a great benefit to us.

Providence, R. I. E. D. L.

A Commission on Military Inventions.

MESSRS. EDITORS:—Some months since I read in the SCIENTIFIC AMERICAN a recommendation that a commission be appointed by government for the examination of such military inventions as should be presented, with a view to the adoption of such as were meritorious. Now, nearly one-third the men of the North are artizans, inventors, &c., and to them such a commission, properly conducted, would prove of infinite benefit, and some little attention should be paid to the interests of such a large class of people. But it is not the interests of inventors alone that would be improved. The expense of the present and all future wars would be greatly reduced, he loss of life diminished, and the whole people benefited; for no sensible man can doubt, after viewing the benefits derived from improvements already made by scientific men in the service, that were the government to call to its aid all the scientific and inventive genius of the nation, these benefits would be universally increased. Great numbers of military inventions have been patented already; yet it is no exaggeration to say that ten times the number lie dormant in the minds of the people, and that hundreds more of scientific men would turn their minds upon military improvements, but they have no encouragement of gaining the least notice from government, and certainly no inducement to procure a patent. The Patent Office, through such a commission, would receive an impulse which it very much needs at the present time. The expense of such a commission might be urged against it, but even though no measures were taken to render the institution self-sustaining, such as charging the expenses of examinations to inventors themselves, the advantages that government would derive by causing every invention it adopted to pass through the rigid and impartial examination of this commission of the most learned men in the various branches of science, and none others should constitute it, would more than repay all its costs. It would seem, for these few reasons, that mechanics and inventors would be sufficiently warranted, through petition or otherwise, in calling the attention of Congress to this important subject. Cannot something of the kind be attempted? C. D. ELLIOT.

Somerville, Mass., Dec. 9, 1861.

How to Preserve Telegraph and Fence Posts.

MESSRS. EDITORS:—I noticed an article in the last volume, No. XX., SCIENTIFIC AMERICAN, on telegraph posts. I wish to suggest an improvement in setting them. After the post is put in the ground, and the hole filled up to within fourteen inches of the top of the surface, then put about one-half a bushel of iron chips around the post and fill up with earth two inches above the chips. These chips will soon form a solid mass around the post, which will help to keep it firm and prevent it from rotting. Two hitching posts in front of my house were put into the ground, with iron chips around one while the other was put in as usual. I had occasion to take them up a few weeks ago and found the one with chips around it perfectly sound, while the other was entirely rotten. These chips can be got at any machine shop at a very little cost. It will take about thirteen bushels of them per mile for telegraph posts. J. A. H.

Amsterdam, N. Y., Dec. 8, 1861.

An Invention Wanted.

MESSRS. EDITORS:—There is an invention which might be made that would greatly benefit printers, and especially that part of them that have the gas bills to pay for light on morning papers. Can you not start inventors to work to make a shade or reflector that will throw the light from one gas burner on two or more cases? The cases of compositors, as you know, are back to back, the type setters in opposite alleys facing each other. If the light is over the center of these two cases can not a reflector be constructed that will light two from one jet. If an improvement of this kind was adopted it would save one-half the gas bills on morning papers, which would be a serious item. I would like to adopt it, for one. If you can start inventors on this subject, if there is nothing of the kind now in use, I think you will deserve the thanks of the entire craft.

J. E. R.

Indianapolis, Ind., Dec. 13, 1861.

How to Make Sulphate of Iron—Copperas.

MESSRS. EDITORS:—This salt is manufactured from a native sulphuret of iron, of which there are great quantities in some parts of the United States, where it forms the principal part of the rocks of whole districts. In England it is made from iron pyrites, which are found in globular masses in the coal strata. In making the copperas, a quantity of these pyrites are piled upon an inclined platform, and sprinkled with water from time to time. As this drains through them it carries those portions which have been rendered soluble by the action of the atmosphere, the sulphuret having absorbed oxygen, and having thereby been converted into an acidulous sulphate. These drainings are received into large stone cisterns and pumped from thence into leaden pans, where a

fire is kept up under them for several days, during which time large quantities of old iron are thrown in to saturate the excess of acid and precipitate any persulphate that may have formed. When this solution is sufficiently concentrated it is drawn out into stone cisterns, where it cools and crystallizes. In this state it is of a light green color, and is the protosulphate of iron; but by exposure to the air for some time it absorbs the oxygen, and is partially converted into the red persulphate. In a dry atmosphere it effervesces and parts with its water of crystallization, and is then a dry powder, and on being dissolved again in water it is found to be composed of the persulphate and protosulphate of iron. When copperas is fresh and green it is then in the best state for deoxidizing indigo in the copperas blue vat of the cotton dyer, but when it is older, or has been oxydized, so as to appear brown or yellow, it is then better adapted for dying black than when fresh and green. The specific gravity of its concentrated solution is 1.753, and of the salt itself 1.850. It is composed of 27.27 of protoxide of iron, 36.30 of sulphuric acid, 42.43 of water in 100 parts. R. H. Gibson.

Fisherville, N H., Dec. 21, 1861.

Chemical Nomenclature.

Messrs. Editors:—As an amateur chemist I beg leave to offer a protest against the frequent changes that are attempted to be brought about in science, but more especially in that of chemistry under the name of reform, especially when sanctioned by only a few writers on the subject. I now refer to the attempt made to "drop the final vowel" in the change that has already been made in the *urets* to *ides*. If we go on this way, meekly submitting to every change in nomenclature that is proposed, we shall utterly ruin our almost perfect nomenclature. The effort to drop the final vowel in the *ates* was made by Thomas Cooper above forty-five years ago, in his Emporium of Arts and Sciences. If it is really necessary to make a change in nomenclature, or to improve it, let there be a society of chemists formed for that purpose, similar to that of which the lamented Lavoisier was the head.

I agree exactly with the Scientific American, and I am heartily glad to see its verdict. We will keep the *e*. J. J. B. Hatfield.

Martinsville, Ind., Nov. 23, 1861.

Rifles and how to Shoot.

Messrs. Editors:—Many inquiries have been made respecting which is the best rifle, and I have seen it stated that the rifles now used in Europe are better than those manufactured in America. I do not believe this, and accord heartily with your suggestions recently made in the Scientific American to have a great international shooting match to determine the qualities of American and European rifles and marksmen. It is my opinion that our old-fashioned short heavy-barreled rifle, which carries from 60 to 80 balls to the pound, is the best for accuracy and length of range.

I have heard a very common complaint made respecting the incompetency of our volunteer soldiers as marksmen. There are certain rules to be observed, and if these are not followed a man may practice shooting until dooms-day and never become a good shot. For example, a good off-hand marksman places his left foot about nine inches in advance of his right, then takes hold of his rifle with his left hand at a point where it will balance as if held upon a pivot, then standing in an easy well-poised attitude with his head leaning slightly backward, he raises his rifle, taking care to hold it firmly to his shoulder, without canting it to the right or left. In this position he exercises great judgment in taking sight. In looking through the notch in the hind sight he is careful to cover it with the same amount of the front sight every time he shoots. Great care and practice are necessary to become a perfect master in taking sight. The front sight should be black, and if it is coarse, like that on army rifles, it should always be centered through the back notch.

Shooting from a rest is a humbug, so far as it regards qualifications for soldiers. The Scientific American has censured the practice, and old hunters like myself were pleased that this had been done. By observing the foregoing hints for off-hand shooting, and by exercising care in loading, and steadiness in taking sight and drawing the trigger, the subscriber, who is an old hand, is positive that any man, by practice, will become a good marksman. R. H. H.

Evansville, Ind.

Jolly under Adversity.

An old subscriber from Elida, Ill., incloses a gold dollar in a letter, which reads as follows:—

My subscription ran out with No. 6, Aug. 10, and not having a sufficient supply of the "ready" on hand, I had to make a virtue of necessity, and content myself with reading over the back numbers of the Scientific; but, glory be to nobody! I have at last stumbled over a little round yellow "contraband," and forthwith send him speeding on an errand of mercy; and well named at that, for a duller, gloomier time than I have had since the Scientific discontinued its "come," will scarce find its equal in the annals of time. However, to cut the matter short, send along the back numbers (for I want to keep a file of it as long as I do take it) and continue as long as your conscience will allow.

How to Preserve Potatoes at Sea.

Captain Gilbert Smith of the Barque *Martha Wenzel* has communicated to the Yarmouth (England) *Register* a method by which he succeeded in preserving potatoes at sea during long voyages. When it is well known that vegetables are the best anti-scorbutic medicine, this information will be found of great benefit to whaling vessels, and those making long voyages to Australia, the East India and China. "To preserve potatoes" Captain Smith says, "put them into a pen on deck, the door of which must always be kept open in good weather. Scatter over them a quart of air-slacked lime to every twenty-five bushels; pick them and rub off the sprouts once every month. Put up and kept in this manner, they will remain good five or six months." On the 1st of August, 1861, he says: "I have now potatoes on board that were taken in at Melbourne, January 20th; the vessel since has been to Callao, Chinchas, and is now within a few days' sail of Bourbon and Mauritius; consequently the potatoes have been on board, and daily used from six months and ten days, and, for cooking purposes, they are as good now as when taken on board at Melbourne. Last voyage we took our sea stock of potatoes at Talcahuano, Chili, March 10th, arrived in London July 5th, and sold off stock, leaving some three bushels for family use. I have eaten new potatoes that were grown on the old potato in the pen; the old potato sound, but the outside being shriveled and shrunk, something like a dried prune or raisin. I merely mention these two cases as a proof of what I say, and can adduce more if wanted. I would further add in this matter, that if potatoes were taken out of the damp cellars in the spring and put in some dry outbuilding with a good circulation of air, and a little lime mixed with them, they could be kept until July and August in a good state of preservation."

The Oldest House in Boston.

The following intersting bit of history is from the Boston *Commercial Bulletin*:—

The ancient wooden building on Washington street, opposite the head of Milk street, and now occupied as a book store by Willard Small & Co., was built in 1656, and is consequently now two hundred and five years old. The timber of which this building is composed is of good solid oak, cut within a short distance of the spot. It is still sound and in a good state of preservation.

During the administration of the Royal Governor, Hutchinson, in old colony times, this house was occupied by his secretary of state, and for many years the *elite* of Boston in those days were his welcome guests. During the revolution, Washington honored the mansion with his presence, and dined with the family who occupied it. The lamented Warren also dined there but a few days previous to the battle of Bunker Hill. After the revolution, this old mansion became noted as the most fashionable dancing hall in the city, where the bon ton tripped the 'light fantastic,' to their own enjoyment and the exclusion of those who were not in fashionable society. Entrance to the hall was gained by means of a flight of stairs outside, on what is now called Harvard Place. The present occupancy of the old building as an antiquarian and second hand book store, seems peculiarly appropriate to bibliomaniacs and lovers of rare editions of books, who feel as if the very atmosphere of the place was hallowed by ages past, and best befitting those who enjoy poring over curious and quaint old black-letter tomes.

Locomotive Building.

The *Railway Review* says:—Business at the various locomotive shops is on the improve. We are informed that Messrs. Baldwin & Co. of Philadelphia have contracts in hand that will keep their full shops employed until April next, with encouraging prospects of additional orders.

The Rogers Company of Paterson have several machines under way, and encouraging prospects of larger orders. Danforth, Cocke & Co. are at work upon three large coal-burners for the Camden and Amboy Railway; and we hear of orders in course of negotiation by other builders. The prospects are more encouraging for all kinds of railway manufacturers. Railway companies, from motives of prudence, have made but little renewal of equipment since the commencement of the rebellion; but, as railway machinery is rapidly perishable, and as its employment for the past season has been immensely greater than the most sanguine could have predicted as being compatible with a condition of intestine war, renewals are inevitable; and, as railway directors recover from their unfounded apprehensions of an extensive loss of traffic and gain confidence in the ability of the loyal States to master the position assumed by the government, they must increase in proportion as orders have been withheld, until the stock is brought to its former efficiency.

Livingstone, the African traveller, describes an ingenious method by which the Africans obtain water in the desert: "The women tie a bunch of grass to one end of a reed about two feet long, and insert it in a hole dug as deep as the arm will reach, then ram down the wet sand firmly around it. Applying the mouth to the free end of the reed, they form a vacuum in the grass beneath, in which the water collects, and in a short time rises to the mouth. It will be perceived that this simple, but truly philosophical and effectual method, might have been applied in many cases in different countries, where water was greatly needed, to the saving of life. It seems wonderful that it should have been now first known to the world, and that it should have been habitually practised in Africa, probably for centuries. It seems worthy of being particularly noticed, that it may no longer be neglected from ignorance. It may be highly important to travelers in our deserts and prairies in some parts of which water is known to exist below the surface.

Blue and Red Glass for Chemists' Bottles.—It is quite customary with doctors, druggists and photographers, to employ blue glass bottles for the purpose of keeping such chemicals as the nitrate of silver, which is so easily affected with light. It is pretty generally believed that the blue color of the glass counteracts the effects of light, but according to the experiments of M. Dumey, of France, this is not so. He asserts that the blue color does not interfere with the chemical rays of light, and that white glass and blue glass bottles are alike unfit for containing silver solutions. He states, however, that red glass bottles are perfectly reliable to use for retaining sensitive chemical substances, as this color prevents the light affecting them.

An establishment for refining Chinese sugar cane sirup is now in successful operation in Chicago, Ill. It is specially devoted to the making of sirup (not sugar) which is equal, it is stated, to that obtained from sugar cane. The company offer to receive crude sirup from farmers, and refine it, for ten cents per gallon. The sirup is first placed in a copper pan, and when it commences to boil a small quantity of lime water is added. After this it is strained through canvas sacks, then filtered through animal charcoal and afterward concentrated in the vacuum pan, at a temperature of 160° Fah.

A number of 6-pounder rifled steel cannon are being made by the Putnam Machine Co., at Fitchburgh, Mass. Three of these guns have been finished and tested satisfactorily. Each weighs 800 pounds, and has a barrel six feet long.

The New Bedford (Mass.) *Mercury* says that there is an extraordinary diminution in the number of vessels employed at that port, and if some new business is not started the city must decline in wealth and population.

THE GOLD MINES OF NOVA SCOTIA.

A paper was lately read on the above subject by Principal J. W. Dawson, of the McGill College, before the Natural History Society of Montreal. He says, "There is little room to doubt that gold will be found throughout the entire coast metamorphic district of Nova Scotia." Careful examination may show that the gold occurs chiefly or entirely in the veins traversing certain bands of the thick beds of slate and quartz rock in these districts; and these may be recognized by their mineral character, especially if defined in their relation to the other beds by a detailed survey of the productive localities."

In the last number of *Silliman's Journal* there is an article on this subject by O. C. Marsh, A. B., of the Scientific School, Yale College. He states that there is a belt of metamorphic rocks extending the whole length of the province of Nova Scotia, varying in width from ten to fifty miles, and that it is composed mainly of clay slate and quartzite, replaced by mica slate, gneiss and granite in some sections. This coast range, according to Prof. Dawson, probably belongs to the old silurian. Mr. Marsh has visited the Tangier mines, situated sixty-seven miles east of Halifax. The strata which contain the gold consist of clay slate, traversed with compact veins of quartz.

The strata is much disturbed, and an examination for fossils was unsuccessful, the igneous action so evident in this region had probably obliterated all traces of such. Perfect fossils, however, have lately been discovered near St. John, New Brunswick, in clay slate. The gold at Tangier occurs mainly in the quartz veins, which are about one foot in width. Gold, in no small quantity, has also been found in the soil and in the bed of a small stream near the mines.

Among the specimens of gold obtained, Mr. Marsh noticed three isolated crystals, which resembled in general appearance those brought from California. The mines at Tangier are on government lands; a claim of 30 by 33 feet is rented at $20 per annum, and during last August 700 men were working on the claims, and a large amount of gold had been taken, but at least one-third was lost by the rude mechanism used for its extraction. One apparatus used consisted of two large granite boulders attached by short ropes to a horizontal beam on either side of an upright shaft, and two horses dragged them round about, as in the old horse gin. The quartz was put on a paved floor, and kept wet, and was crushed by the two boulders as they were dragged over it.

At Lunenburg, about seventy miles west of Halifax, and about one hundred and thirty from Tangier, the gold also occurs in quartz veins, traversing the clay slate. This locality has yielded large quantities of gold with very little labor. These mines are upon the sea shore. Mispickel is abundant, and its presence makes gold washing among sand very troublesome. "While at Lunenburg," says Mr. Marsh, "I was informed of a circumstance connected with the discovery of gold, which illustrates the utility of even a little scientific knowledge, and the need of its more general diffusion. Some years since, a farmer living in the neighborhood of Chester, thought he had discovered a valuable copper mine on his land, and at great expense he sunk a shaft about 80 feet in depth. Finding little copper to repay his labor, and having exhausted all his means, the work was finally abandoned. In his exertions, he had cut through a large quartz vein richly stored with gold, which he had noticed, but supposed it was merely copper pyrites. The present owner works this copper mine for gold."

The Tangier gold of 18.95 specific gravity, as analyzed by Mr. Marsh, contains gold 98.13 parts; silver, 1.76; copper, .05; iron, a trace. The Lunenburg gold is very similar in composition. The metamorphic strata of Nova Scotia are similar to the gold-bearing rocks of other countries, and are of vast extent. The extraction of the gold at these mines by quicksilver had not been commenced, hence all the finest gold was lost in the washing. The total amount of gold hitherto obtained has not been ascertained.

THERE are 613 effective vessels of war in the British navy; these are manned by 80,000 sailors, and armed with nearly 15,000 guns. There are 449 war vessels in the French navy; which is manned by about 30,000 sailors, and armed with 8,322 guns.

The Russian Ship of War "Grand Admiral."

We find the folloing in *Mitchell's Steam Shipping Journal*. It will be remembered that the *Grand Admiral* was built for the Russian government by Mr. Webb, in this city:—"The Russian screw-steamer *Grand Admiral* is still at Malta. This vessel is considered one of the finest in the Russian navy. Her crew consists of upward of 800 men, are young, strong and active. She has very heavy guns, with plenty of space to work them. She appears to be as if specially made for fighting and everything is subservient to that. Besides their mess place, which is large and airy, they have a spacious place handsomely and usefully fitted up for the junior officers to study in. It is supplied with books of a useful nature, in English, French and Russian. One officer was translating into Russian and preparing for publication "Boyd's Naval Officer's Manual," another was doing the same by Alston, and a third was hard at work at the "Manual of Scientific Inquiry." Both the officers and men have been buying up all the English works on seamanship they could procure, and make every inquiry as to the state of our navy, doing their best to pick up information. Of some 600 copies of the Bible in the Russian language that existed at the Bible Society's depot at Malta, there is not a copy left, for all have been bought by the Russians, and they would have purchased more could they have been procured. Nearly all the officers speak fluently one or two modern languages.

The Flax and Linen Trade of Ireland.

Belfast, the great emporium of the linen trade, last year exported 65,600,000 yards of linen and 13,200,000 lbs of linen yarn and thread. Next in importance to the flax industry, is the trade in sewed muslins, employing about half a million persons in Ireland. Another manufacture carried on in Belfast is important in the consumption of agricultural produce—namely, starch-making from wheat. Ten firms use nearly 30,000 quarters of the finest red wheat every year. The wheaten starch made by the old fermentative process, is largely used by bleachers, the goods retaining their stiffness longer than if dressed with the rice and other starches. The whole of this business is at present nearly paralyzed as America was the best market for Irish linen goods, very limited quantities of which have been imported during the past nine months.

The Coal Area of Countries.

As coal is the real stable wealth of all the manufacturing and commercial countries, the following table will show which contains the greatest proportion of black diamonds.

Countries.	*Prop'n of whole area.*	*Prod'n in tons.*
British Islands	1-10	80,000,000
Belgium	1-22	5,700,000
France	1-100	4,500,000
United States	2-9	14,000,000
Prussia	1-90	3,500,000
British North America	1-20	900,000
British India	——	370,000
Bohemia	1-20	300,000
Spain	1.52	250,000

What a future for America is involved in the fact that nearly a fourth of her whole area, as far as investigated, is covered with coal!

A Steel Steam Sloop.

The Plymouth (England) *Mail* states that a steel steam sloop, constructed to draw only six feet of water, has been built by the Severn Steam Navigation Company. She has a movable keel like several of the American coasting sloops. She is about 120 feet long and registered 91 tuns, is supplied with engines of 40-horse power, can stow about 12½ tuns of coal, and usually expends about 50 cwt. in 24 hours. Her screw propeller has been altered no less than six times, the owners being most desirous of ascertaining the best principle for adoption in some ships of 300 tuns which they contemplate having built.

OREGON has no magnetic telegraph as yet, but it is arranged that before the middle of 1862 Portland shall be in communication with the wires of California, and through them with Chicago, New York and Boston. Sitka, in the Russian possessions, is only 900 miles from Portland; and when a line is completed between the two places, to connect with the Russian line, 3,500 miles long, soon to be undertaken between the Amoor river and Sitka, the circuit of the world will be complete.

Army Uniforms.

The following telling hits are from the Washington correspondence of the *Boston Journal*:—

The uniform of the United States army was, reduced to the plainest possible standard by Jeff Davis, and there is but a trifling difference between the costumes of dragoons, artillerymen, infantry or engineers, all of whom wear clothing of the same color and cut, different trimings alone distinguishing each arm of the service. This is economical, but it fails to inspire the men with soldierlike pride by fostering a commendable rivalry between different corps. Proof of the beneficial effects of a distinctive and a somewhat showy uniform is seen in the volunteer service, where the men of the French, the Zouave and other regiments are always far neater than those who slouch about in ill-fitting blue blouses, or who are disfigured under dirty snuff colored greatcoats. This but confirms the experience of those who have had charge of the uniforming of the armies of Europe, and Louis Napoleon first set the example of returning to the gayer and more varied uniforms of the time of his Imperial uncle.

It has consequently been determined that the six hundred thousand suits of uniforms, soon to be ordered for our army, shall be more showy and more varied and distinctive than the present regulations prescribe. A board of officers will soon commence its sessions, and it is to be hoped that they will adopt more becoming uniforms than those now worn. The felt hat will certainly be discarded, and it is probable that a *shako* will be adopted, with a waving horse hair plume, of the distinctive color of the arm of the service to which the wearer belongs.

High boots are almost invariably worn by the officers of cavalry, and many of the infantry men sport them; gaiters are worn by many of the regiments, and they are well calculated to protect the pants from the sticky clay mud into which the sacred soil has been trampled.

Condition of English Cotton Mills.

Important statistics referring to 842 cotton mills in Lancashire are published. Of the total number 295 are working full time, 75 five days in each week, 305 four days, 118 three days, and 49 have ceased running altogether. Of 172,257 work people employed in these mills, 64,393 are working full time, 15,572 five days in each week, 55,397 four days, 28,832 three days, and 8,063 are totally unemployed. As it is very probable that each subsequent month will add to the number of those on short time or totally unemployed, a large increase of pauperism must be expected during the ensuing winter. The annual exportation of Manchester manufactures amounts in value to $260,000,000, but owing to the American war some of the markets are closed and others have been so depressed as to prove indifferent customers. Hence there has been a glut of goods, which have come back upon the manufacturers.

The amount of capital embarked in cotton industry in England has been estimated, in the year 1860, at £100,000,000 (about $500,000,000), which serves to give some idea of the absolute immensity of the interest involved.

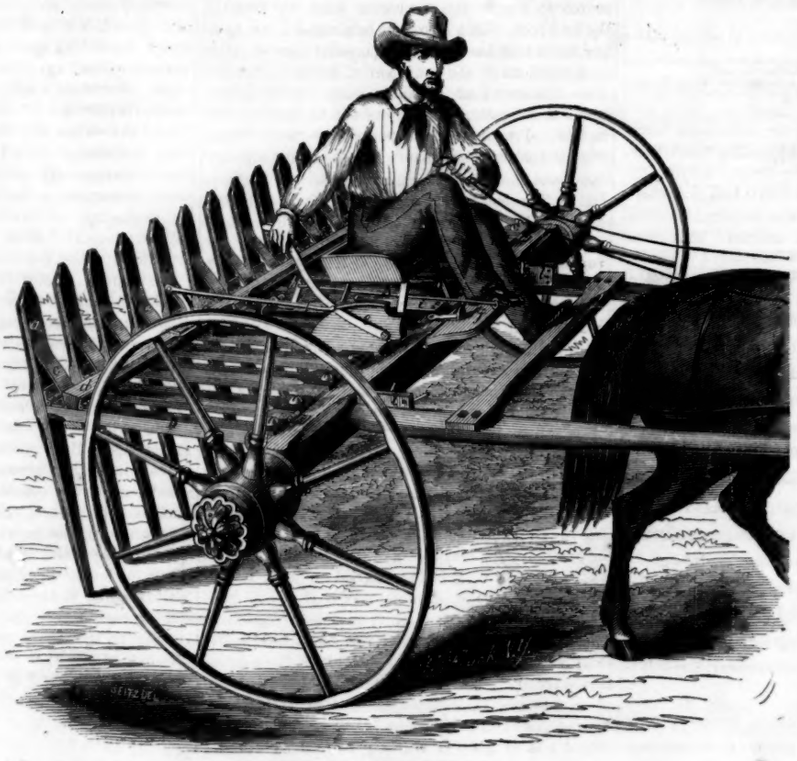
THE EARTH A BURNING CAULDRON.—In one of his recent lectures at Manchester, England, on "Prophecy," Rev. Dr. Cumming said he had consulted Sir. Roderick Murchison as to the truth of the statement that the interior of the earth was a burning cauldron. Sir Roderick replied, that "no one but an ignoramus would dare to deny it." And when he (Dr. Cumming) quoted the words of Peter, in support of his statement, Sir Roderick replied, that "not only was Peter scientifically correct, but that Job gave him (Sir Roderick) the first idea of gold mines in Australia, and that Job was the best geologist he ever knew."

THE London *Engineer* says:—"There are many persons, no doubt, who do not yet understand what wonderful piece of ordnance it is that is now heard of as a "shunt" gun. It is Sir William Armstrong's muzzle-loader, a wrought iron gun rifled with two sets of grooves, the shot passing down one, and, partially turning on its axis, or "shunting," at the bottom being guided out by the other. With these grooves the strain on an ordinary cast iron gun is such as to burst it after a very few rounds, whilst in a wrought iron gun the loss by friction is great, and the grooves must inevitably soon wear out."

Improved Horse Rake.

Among all the agricultural implements which have been invented in modern times we know of no other that pays for itself so quickly, in the labor that it saves, as the horse rake. Frequently the saving in a single day amounts to more than the cost of the implement. As this economy is manifest, it is extending the use of the implement very rapidly among all our farmers, and the enormous demand is stimulating inventors to bring the instrument to the very highest state of perfection. The accompanying engravings represent a rake invented by Edward Buckman, of East Greenbush, N. Y., that possesses some marked peculiarities and advantages that will be manifest from its construction.

Each tooth, *a*, is attached by a simple hinge to the rear end of a horizontal bar, *b*, and is held in place by a spring, *c*. These springs are secured to a rock shaft, *d*, which is fastened to the upper side of the bars, *b*, by hinges, so that it may be turned partly over, withdrawing the springs from their pressure against the teeth and allowing the teeth to swing loosely back. The rock shaft is turned by means of a lever, *e*, with which it is connected by a rod, *f*. For gathering the hay the lever is pushed back to the notch, *g*, which holds it in place, thus pressing the springs against the teeth and retaining the teeth in the proper position for raking. When the large space in front of the teeth is gathered full of hay, the operator releases the lever, *e*, from the notch, when the teeth immediately swing back, depositing the hay in a large windrow, over which they are lightly drawn by the onward progress of the rake.



BUCKMAN'S HORSE RAKE.

The release of the teeth is facilitated and their passage over the windrow is lightened by raising the rear ends of the bars, *b*, and with them the rakes, a little above their ordinary position. This is effected by means of a bent lever, *h*, which is secured by a hinge joint to the rear end of the bar, *i*; this bar being attached rigidly to the axle. The bars, *b*, are all rigidly secured to a rock shaft that is hinged to the axle, and it will be seen that when the upper arm of the lever, *i*, is drawn forward by pressing down the footboard, *j*, with which the lever is connected by means of the rod, *k*, the rear ends of the bars, *b*, are elevated. This also arranges the rake for transportation to and from the field.

The proximity of the teeth to the ground may be varied to adapt the rake to rough or smooth fields by altering the position of the shafts in relation to the axle. The shafts are connected with the axle by a hinge at their ends, and their position in relation to the axle is fixed by bolts passing through them and through wood or metal projections, *l l*, which are fastened rigidly to the axle; three or four holes being provided for the passage of the bolts in different positions.

It will be seen that this rake deposits the hay in the windrow without rolling it into a tangled rope; thus leaving it in a good situation to dry and to be easily pitched upon the cart or wagon. This mode of gathering the hay, furthermore, not only prevents the accumulation of dust, but shakes out of the mass any dirt that may have been thrown upon it, collecting the hay in a remarkably clean condition. The rake is of unusually large capacity, permitting the gathering of the hay into very large windrows. It is also admirably adapted to the work of raking grain to be bound; and, finally it makes a good drag for covering seed.

This rake was in practical use during the last season, giving perfect satisfaction, to the many farmers who witnessed its operation, and being commended especially for the clean condition in which it left the hay. A premium was awarded to it at the State Fair.

The patent for this invention was granted through the Scientific American Patent Agency, September 3, 1861, and further information in relation to it may be obtained by addressing the inventor, Edward Buckman, at East Greenbush, N. Y.

SQUYER'S COMPENSATING SPRING BALANCE.

The accompanying engravings represent a novel, ingenious and exceedingly simple spring balance for weighing, invented by O. S. Squyer, of Penn Yan, N. Y.

A band of steel, *a*, of spring temper, bent into an oval form, is crossed at its shorter axis by a graduated brass rod, *b*, and is furnished with four hooks, as shown. In weighing any body of not more than five pounds in weight, it is suspended to the hook, *c*, which opens the spring by elongating its shorter axis. In this case the weight is indicated on the scale, *d*, running outward from the zero point. In weighing bodies of a weight higher than five pounds, the body is attached to the hook, *e*, when it elongates the spring, increasing its longer axis. In this case the weight is indicated on the scale, *f*, running inward from the zero point. The balances may of course be made for greater weight, if desired. From the construction of this balance the expansions and contractions of the spring, resulting from changes of temperature, are counterbalanced or compensated by corresponding contractions and expansions of the index bar, and hence the balance preserves its accuracy. The straining of the spring both ways also tends to prevent it from receiving a permanent set in one direction. The inventor further claims that this spring is made of less material, and that it is cheaper and more reliable than any other spring balance.

The patent for this invention was granted May 8, 1860, and further information in relation to it may be obtained by addressing the inventor as above.

Machine for Mining Coal.

The London *Mining Journal* describes a machine invented by Messrs Ridley and Rothery for cutting into seams of coal in mines. This machine hews seams of coal by making a narrow undercut in a horizontal or nearly horizontal direction, and also one or more vertical cuts on the face of the coal; the depth of all such cuts vary according to the size of the block required; a series of holes are then drilled along the upper part of the intended block in a horizontal direction, in order to facilitate the detaching of the block. One arrangement of machinery consists of a suitable framing, mounted on wheels, and provided at top and bottom with a horizontal transverse rocking shaft, and at the two opposite sides with similar shafts, placed in a vertical position. Each of these shafts carries one or more vibrating arms keyed thereon, and these arms are each provided at their outer free ends with a suitable cutter for acting upon the coal. A vibratory or oscillating motion is imparted to these arms by the aid of a crank and of ratchet-wheels, in combination with helical springs on the shafts, the springs serving to give the necessary blow or stroke for effecting the cut, while the crank and ratchet-wheels return the arms to their original positions again in readiness for a fresh stroke.

TAN BARK EXPLOSIVE POWDER.—M. Reynaud's new French powder called pyronime, consists of nitrate of soda, 72.5 parts by weight, spent tan bark, dry, 87.5; sulphur in powder, 50. The nitrate of soda is first dissolved in a small quantity of water. The spent tan bark in powder is then mixed in this and the sulphur in the same manner. It is now dried in a warm apartment, and is fit for use as a substitute for gunpowder. It contains all the explosive ingredients of common powder. The tan bark is a substitute for charcoal, and the nitrate of soda, for the nitrate of potash.

AN ancient Roman mirror was lately exhumed at Mayence, France, when it was found by chemical analysis to be composed of tin, 19.05; lead, 17.29; copper, 63.39. This approaches nearly to the composition of speculum metal.

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VOL. VI. NO. 1.....[NEW SERIES.].....*Eighteenth Year.*

NEW YORK, SATURDAY, JANUARY 4, 1862.

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THOUGHTS FOR THE NEW YEAR.

The printing press is the great agent of modern civilization. It treasures up the discoveries of the past, and renders them available for the present and the future. The rapid advancement of modern nations in practical knowledge is chiefly due to the art of printing, as no useful discovery is now permitted to be lost. But unless acquired knowledge is used as a stepping stone to reach higher attainments in science it fails of its great object, not from any defect in itself, but in those who neglect to employ it. Attainments in scientific and practical knowledge, are talents given to men to be employed in the discovery of new truths. This is the view which should be taken of all knowledge in order that man may fulfill his great mission of attaining to a higher civilization.

Another year has just closed and a new one commenced under auspices, which from a partial examination, may appear unfavorable for our onward progress. "Wars and rumors of wars" exist in the land, but these should not discourage men of science, or inventors. It is a most remarkable fact that a number of the most useful inventions and discoveries on record were coerced—as it were—out of difficulties which surrounded a nation beleagured with foes. The Jacquard loom which revolutionized the art of ornamental weaving, was invented in France during a most active war period. And when the same country was prevented from importing foreign sugar, a new source to supply the saccharine juice was found in the beet root. This discovery originated a new manufacture which has entirely superseded cane sugar in many sections of the continent of Europe. Another great discovery made in France, under similar difficulties, was the manufacture of soda from common salt in 1796. Previous to that period soda was obtained from the ashes of sea plants found on the coasts of Spain and the islands of Sicily, Ireland and Scotland, and as these sources of supply were closed in the early war of the Republic, a reward was offered by the Directory for a discovery that would render France independent of the foreign alkali. The result of this was that Le Blanc, an apothecary, invented the process of obtaining soda from common salt by decomposing it with sulphuric acid and then roasting the product with coal. This process has been adopted in all manufacturing countries, and respecting its value we may justly assert that the wealth and civilization of almost every nation may now be measured by the amount of soda which it consumes. These great discoveries, which were made under great national conflicts, should inspire us with faith for the future.

Sulphuric acid has been termed "the key of the chemical arts." All of this acid that is manufactured in the United States is obtained from Sicily sulphur and West India sulphur shales. Why may it not be manufactured from native pyrites which are so abundant in many portions of our country? A new discovery for recovering all the gold from finely comminuted quartz and auriferous sands without using quicksilver, would be invaluable. Chemistry invites man to a thousand of such discoveries.

As regards the mechanical arts, this has been called "the age of iron." Although American wrought iron is of a very superior quality, we must remind our manufacturers that we still import most of our best steel from England, while we ourselves possess superior ores for making this metal. There is a very inviting field still open for improvements in the manufacture of iron and its alloys. It has now become evident, that iron must hereafter enter very largely into the construction of ships of all classes. To this topic we have, on several occasions, directed public attention, and will say no more respecting it at present, except to invite chemists and others to the discovery of a new substance for protecting the hulls of iron ships from seaweeds and minute shellfish. Arsenical, lead and copper paints have been applied in vain, and a new compound has been earnestly solicited by the owners of iron vessels. Light locomotives for small trains on city and other railroads have not yet been generally adopted.

Did space permit, we might point out a multitude of desirable improvements on which attention should be engaged as a duty to the Creator of the human intellect, as well as to ourselves, our country and fellow man. If in this spirit we all commence the NEW YEAR our progress during Eighteen Hundred and Sixty-two will be as marked and gratifying as it has been during any previous year.

THE MASON AND SLIDELL WAR FEVER.

If we may judge from the tone of the Canadian press, the people of the British Provinces are seized with a sort of war panic, and are actually engaged in organizing for a sanguinary conflict with the people of the United States. The supposition seems to prevail there that a war with us is inevitable, and that the brunt of it will naturally fall upon them. The same belligerent spirit seems also to have seized upon the people and press of Great Britain, and one is almost forced to the conclusion that the bold British lion is about ready to spring upon us with all his savage ferocity.

We do not pretend to know what complications may yet arise between this country and England to produce a war between them, but we know from observation and from personal intercourse among men of influence in this city and at Washington, that such an event would be greatly deplored, and that no honorable means should be left unemployed to avoid what all would regard as a terrible calamity to both countries. As a people we do not love war. It has no charms for us, and every sentiment of religion and humanity protests against it unless it is justified by high national considerations.

The pretext or ground upon which this unwonted war flame has been fanned into life, grows out of the seizure of Mason and Slidell on board an English vessel. This can undoubtedly be made a cause of war; and if the British government is determined to push matters to that extreme, then there is no way of escape. We must buckle on our armor and do our best against a powerful foe, whose ability to do us serious injury at this time no one can deny. But we do not believe it should be made the cause of war. We believe it can be settled by peaceful diplomacy, and that, too, without tarnishing the honor of either nation.

We sincerely believe that our government, in the Mason and Slidell affair, will act in strict accordance with well-settled principles of international law, and if wrong has been done to a friendly power ample reparation will be made. Captain Wilkes, in boarding the *Trent* and removing therefrom those obnoxious persons who were confessedly bound on an errand of war against our government, acted upon his own responsibility, and it must be acknowledged, after a careful perusal of his report of the transaction, that he acted with a commendable degree of prudence and consideration. He consulted reliable works on international law before proceeding upon his delicate duty, and came to the conclusion that he was justified in making the arrest. Those who know Capt. Wilkes believe fully that he was actuated by just and honorable motives, and without the slightest desire to insult the honored flag of a great nation. If it were at all irregular to arrest the envoys and allow the vessel to proceed on her journey, notwithstanding she was violating the Royal proclamation, Capt. Wilkes did so out of regard to the interests of the British government, whose mails she carried. Now it seems to us that unless Great Britain is really determined to get into a war with us for the purpose of attempting to force the Southern blockade, with a view to secure cotton (which we confess has caused us some anxiety for months past), there need be no occasion for trouble from the *Trent* affair. It can be honorably adjusted, and we feel satisfied that if Capt. Wilkes did violence to the settled principles of international law in arresting Mason and Slidell, they will be returned. If not, Great Britain ought not to demand their restitution.

Upon this law point there seems to be a diversity of opinion; the majority, we think, inclining to the view that there was irregularity in the proceeding in not bringing the vessel and all her contents into port and having the case legally adjudicated upon before a prize court of admiralty. It is asserted that the President and Secretary of State take this view of the case, and it is hinted at in the report of the Secretary of the Navy.

One thing appears to us certain, and that is, that the government of this Republic will never allow this country to drift into a war in defence of principles that cannot stand the search of an impartial international jury. To such a tribunal our people are willing to submit all grave questions if they cannot be satisfactorily arranged without such reference.

We cannot forbear to assert that the British press has treated this subject in an undignified and hasty manner, wholly at variance with what we had a right to expect from such a source. Some of our papers, it is true, have gone mad for months past, but this is no excuse for the passionate ebullitions of the British press, which claims to square its conduct by more conservative rules.

THE result of having engravings published in the SCIENTIFIC AMERICAN is illustrated by the following remarks at the close of a business letter from Mr. Wm. Morehouse, whose engraving of a newly patented lamp appeared on page 376 of our last volume. He says:—"Since your illustration of my lamp in the SCIENTIFIC AMERICAN I have been unable to answer my correspondents in relation to it, and have had to get a circular letter printed."

IRON-CLAD WAR SHIPS—A PATRIOT'S SUGGESTION.

Mr. Donald McKay, the distinguished shipbuilder of Boston, who is now in London, has addressed a letter to the editor of the *Commercial Bulletin* in which he describes the condition of the British navy, and he earnestly exhorts our people to enter upon a system of building iron-clad vessels by which a powerful navy may soon be created. He states that the building of the common class (wooden) of war frigates has been abandoned for the present in England, and the energies of the government are directed exclusively to the sudden creation of a fleet of iron-cased frigates and ships. Five of such are afloat at present; namely, the *Warrior* of 40 guns, and engines of 1,250 nominal horse power; the *Black Prince* of similar size; the *Defence*, of 22 guns; *Resistance*, same size, and the *Hector*, of 32 guns. Mr. McKay states that experiments on a section of the *Warrior's* sides have plainly shown that they are practically impenetrable to the heaviest shot, and this settles forever the question about the superiority of iron-cased ships over those of old construction. Besides the above mail-clad ships two others—the *Achilles* and *Valiant*—are now being built and six others of 60 guns each, are also ordered to be built. The *Warrior* and *Black Prince* are the largest and most powerful war vessels afloat anywhere, but the new 60-gun frigates are much larger still, and they are to be plated all around with five or six-inch plates. By the end of 1862 there will be eighteen of the largest sized iron-clad war vessels completed for the British navy, and the French government will then have twenty completed. Most of the minor powers of Europe are also constructing some iron-clad frigates.

"In view of these startling facts" says Mr. McKay, "it becomes evident that our national fleet ought to be largely and immediately increased so as to be prepared for any emergency. Our navy at the present moment hardly ranks with second European powers and it is entirely insufficient to protect our trade and uphold the dignity of our flag. There is no reason why we should not have a fleet as powerful as either that of France or England. We have the money, the materials, and artizans necessary to build a first-class fleet, and the best sailors to man it." He asserts that it would be easy for us to build in one year, a fleet of from 500 to 600 men-of-war ships ranging from a gunboat up to the largest class of iron-cased frigates. In proof of this being possible, he says:—"In one year we built the astonishing number of 2,034 vessels and steamers of all classes, measuring 583,450 tuns. A large number of these vessels were as large as the biggest class of frigates hitherto constructed. What we have done once we may do again, and working at the same rate, we would be able to turn out in one year 583 ships of 1,000 tuns each." It is also stated that in our six navy yards there is now a stock of the choicest materials for building 100 ships, and a hundred of our great engineering firms would complete the machinery to be put into these ships in less than one year.

Mr. McKay overestimates the capacities of our engineering establishments for building marine engines for frigates. We understand that our Navy Department is doing all it can under the present circumstances, to create an iron-clad fleet. Orders have been given for manufacturing large rolled iron plates, 4½ inches in thickness, for plating from sixteen to twenty vessels, and when these are finished, we shall have a powerful navy.

Mr. McKay suggests that all our line-of-battle sailing ships be cut down one or two decks, covered with iron plates and moored across the entrance of our harbors as floating batteries. It is also recommended that a number of our large clippers—like the *Great Republic*—be converted into screw frigates, and that our seagoing merchant steamers be converted into frigates and gun-boats. Altogether, according to McKay's calculations, we may be able to fit out 2,000 war vessels in six months, and these would be sufficient to protect our coast and meet the first storm. "The times are gone," says Mr. McKay, "when Europe could be frightened by thundering newspaper articles, and the hollow brag of ambitious politicians; we have to show now that we know how to handle engines of war, and to stand the hail of shells and ball. A powerful fleet is the best guarantee of peace for a great maritime nation. Of the truth of this principle England—whose motto is 'free trade and peace with all nations'—is the most striking example." The statements and opinions of Mr. McKay deserve, and will no doubt receive, universal consideration. In the issue of the Scientific American for the 1st of December, 1860, we exhorted the government to prepare materials for building iron-clad ships "If we desired to preserve our authority on the seas." This advice is now being appreciated, and it is gratifying to know that we have rolling mills which can turn out 4½-inch plates of charcoal iron of the very best quality for such vessels, and that we have made a beginning toward building a fleet worthy of our Commonwealth.

SEA-ISLAND COTTON ARRIVING.

By the most recent accounts from Port Royal, S. C., we learn that our army of occupation had secured about four hundred thousand pounds of sea-island cotton, and of this one cargo has already arrived in this city (New York) by the steamer *Atlantic*. A system has been adopted for collecting all the cotton on the islands, which have been captured on the South Carolina and Georgia coasts, and for securing it as confiscated property for the United States government. Col. Noble, late of the 79th Highlanders, of New York, has been appointed to organize the live contrabands into gangs of laborers in the service of Uncle Sam, for collecting the vegetable wool on the deserted plantations, and it is stated that more than a million of pounds will thus be obtained and sent to market to be sold.

The cotton which grows upon the low islands on the Southern coast is the best in the world. It was first cultivated in Sapelo island, near the mouth of the Altamaha Sound, in Georgia; this was in the year 1789. It originated from three sacks of Pernambuco seed sent to Francis Levett from Jamaica, and by careful cultivation it has become unrivaled for the length, strength and silky softness of its fiber. The cotton now cultivated in Egypt is derived from Georgia sea island plants, but it is inferior to the American product. A saline atmosphere and frequent showers of rain are said to be favorable to the cultivation of cotton, hence it is claimed that the cotton fields within the influences of the soft breezes of the Mexican Gulf are most favorably situated for the growth of this important vegetable fiber.

The cotton gin of Eli Whitney is not employed for removing the seed from the fiber of the sea-island variety, it is only applied to the short staple quality. The gin used for this purpose is composed of two wooden rollers, between which the cotton is fed, and in passing thereto it is drawn between the teeth of an iron comb, and the seeds fly off, like sparks, in all directions. The rollers do not cut the fiber like the saw gin, and the seeds of this species of cotton are more easily removed than those of the short staple, otherwise the saw gin would be used for it also. After passing through the roller gin the cotton is whisked, winnowed and put up in pressed bales for market. A few years since, a correspondent writing to us from Florida stated that it was scarcely possible to gin sea-island cotton in damp weather, and he attributed this peculiarity to an electrical condition of the wooden rollers of the gin. He had tried glass as a substitute for the wood, and he found that rollers made of this substance were not so much affected with either damp or dry weather in operating the cotton.

Sea-island cotton is that which is employed for making the fine thread used in weaving Nottingham lace. Within a few days past we have been informed that an English manufacturer of this lace is about to remove his machinery to America and commence its manufacture at Trenton, N. J. This will be the first introduction, we believe, of the *finer* cotton manufactures into the United States, and it may inaugurate a new era in our textile manufactures, as its production will necessitate the construction of much finer spinning machinery than any we have yet attempted. We have on several occasions exhorted some of our large manufacturers to engage in making the finer qualities of goods, because the manufacture of such is not so much affected by the fluctuating prices of the raw material; and because we believe that such goods can be made here just as well as in Europe. We have heard it stated that the moist climate of England is more favorable for making fine cotton and flax yarn than that of the United States. We do not believe this; the climate outdoors has as little to do with the atmosphere indoors in the factories in Europe as it has in those of America, and we well know what this is. It can be rendered moist or dry, as may be required. Sea-island cotton is never quoted in the list of New York prices, as all which has been raised South has usually been sent to Europe. That which has been captured for government in "Dixie" will be worth from seventy-five cents to one dollar per pound, according to its quality, and therefore the troops at Beaufort may be considered as working in a sort of gold field.

CORRUPTION IN THE ADMINISTRATION.

The minds of the loyal people of the United States are well satisfied that the Presidential office is filled by an upright honest citizen, who dares to do his whole duty; but it cannot longer be disguised that in some of the departments a good deal of corruption and dishonesty prevail.

The reports of the investigating committees of Congress, so far as developed, point clearly to serious abuses in our military and naval affairs. In the purchase of ships for the war, and in the purchase of supplies for the army, carelessness, incompetency and downright rascality are all clearly brought to light. This is no more than what we expected; but now that the authors are in some measure brought out to public view, the people who are called upon to supply the sinews of war have a right to demand of the President that he speedily rid himself of all those who are concerned in these dishonest transactions. We hope the President has the courage to perform such necessary acts of decapitation in order that his administration may not become a stench in the nostrils of the people and a blot upon the history of the nation. Free institutions can rest only on the intelligence and virtue of the people. This is proved not only by the principles of human nature, but also by the concurrent history of all Republics. A demoralization of public opinion that would accept corruption as a normal condition of the administration of public affairs would be more disastrous to the country than either domestic rebellion or foreign war. The demoralization of the last administration was a terrible influence of evil against our government, and to have it outcropping so speedily in the new administration is sad indeed. It is not too late to apply the remedy, and we urge the President to do it at once and thus save the government from disgrace and ruin.

DEATH OF PRINCE ALBERT.

His Royal Highness Prince Albert, the husband of Queen Victoria, died of gastric fever, after a short illness, in London at noon on the 15th of December, 1861. Francis Albert Augustus Charles Emanuel, Duke of Saxe-Coburg-Gotha, was born at Rosenau, in the Duchy of Saxe-Coburg-Gotha on the 26th of August, 1819. Saxe-Coburg-Gotha is one of the 36 German States. Prince Albert was the second son of the Duke, and inherited the title. He was married to his first cousin, Victoria, the Queen of Great Britain and Ireland, on the 10th of February, 1840. The Royal conple have been blessed with nine children, all of whom are living. Prince Albert was precluded by the feelings of the English people from any political influence, and he conducted himself in his delicate position with singular good sense; making himself deservedly popular. He was an educated gentleman and took an extraordinary interest in agriculture and the mechanic arts. We have heard an American inventor describe the patience with which the Prince examined a complicated machine for sawing ship timber in forms, taking hold of the machine with his own hands, and operating it in order to thoroughly master its details. His death will be mourned with sincere grief throughout the wide dominions of his royal consort, and it may soften the hearts of the people of England, as well as the heart of their sovereign, to listen to the voice of reason in the midst of their passion.

It has been ascertained that iron telegraph wires which pass near foundries, furnaces, and all works where there is a great deal of smoke, soon oxidize. This is said to be due to the sulphurous acid in the smoke; carbonic acid exercises a more moderate action upon the iron.

NOTES ON SHIPBUILDING—DESCRIPTION OF ONE OF THE NEW GUNBOATS.

Notwithstanding the disarrangement of business caused by the war, there is considerable activity in our ship yards. This is not confined to the building of vessels for the navy; there are a number in process of construction for commercial purposes. The following are now being built in this vicinity:—

At the yard of Messrs. Lawrence & Foulke, Williamsburg, L. I., a propeller of 576 tuns, to run between New York and Coxsackie. She takes the place of the *Isaac Smith*, recently sold to the United States government.

At the same yard there is upon the stocks a tug boat, 110 feet long, for Peter Carey, of this city. The same firm will soon commence a similar boat for the same owner.

At Messrs. Roosevelt & Joyce's yard a beautiful propeller of 550 tuns is being constructed for Messrs. Oliphant & Sons, of New York city, for the China trade.

At the same yard a propeller of 757 tuns is being built for H. B. Cromwell & Co., of New York, and a second of the same size will soon follow.

At John Englis's, New York, a magnificent propeller, of 1,048 tuns, for Messrs. Amor & Co., of New York, is being constructed. The Novelty Iron Works will construct her machinery.

At Thomas Stacks, Williamsburg, L. I., one of the new side-wheel gunboats, recently ordered by the United States government, is being built. The machinery is in process of construction at the Novelty Iron Works. The subjoined are the correct particulars of her hull and machinery:—

Hull.—Length on deck, 205 feet; breadth of beam (extreme) 35 feet; depth of hold, 12 feet; draft of water, with armament, &c., 6 feet 9 inches; floors, molded, 15 inches; sided, 8 inches, and the frames are 24 inches apart at centers. The timbers of the frames are doubled, very close together, and each scarf in the floor is bolted with three iron bolts, ⅞ inch in diameter, while the upper scarfs have iron bolts ⅞ inch in diameter, thus rendering them very secure. The keel is molded 15 inches and sided 12 inches; tunnage, 813 tuns.

Engines.—Inclined direct acting, fitted with balance Poppet valves, arranged with Stevens's cut-off; number and diameter of cylinders, one of 48 inches; area of steam port, 250 square inches; length of stroke of piston, 7 feet; working pressure of steam, 35 pounds.

Boilers.—Two vertical, tubular, over back of furnaces; breadth of boilers, 9 feet 6 inches; hight of same, exclusive of steam chimney, 9 feet; number of furnaces, 3 in each boiler; breadth of these, 2 feet 6 inches in the clear. The fire-grate bars are of cast iron, one inch wide at top, with ⅝ inch air spaces between them. They are in two lengths of 3 feet 3 inches each, and supported on suitable bearers and legs of wrought iron; external diameter of tubes, 2 inches: total grate surface in boilers, 97½ square feet; total heating surface, 2,600 square feet; diameter of smoke pipe, 4 feet 8 inches; hight of same, 40 feet. Before the boilers are placed in the vessel they are to be subjected to a hydrostatic pressure of 70 pounds per square inch, and made safe and perfectly tight under it.

Water Wheels.—Have one cast iron center, with three flanges, connected by cross webs; length of center on shafts, 28 inches; outside diameter of eye or hub, 21 inches. Each wheel has 20 oak paddles, 9 feet long, 15 inches wide and 2½ inches thick, beveled on edges, and secured to the arms by wrought iron hooks and nuts 1¼ inch in diameter. There are nine hooks to each paddle. They also have three sets of wrought-iron arms—middle set consisting of 20 long arms, and the two outside sets having 10 long and 10 short arms each. All the arms are of 4 inches by ⅞ inch. Each wheel has two rims, the inside rim being 3½ inches by ⅝ inches, and the outside of 4½ inches by ⅞ inch, having an exterior diameter of 22 feet 9 inches. All of these rims are of wrought iron.

This vessel is built of the best white oak and hacmetac, and is fastened in the most approved manner with the best materials. It is constructed in the same manner as an ordinary ferryboat, going forward or backward with equal facility. This peculiar model was adopted as being the best for coast purposes; it being thus enabled to enter narrow inlets and streams and maneuver without being necessitated to turn around. Her engine will be so arranged that it may promptly and easily be worked by one man with a starting bar, and either going ahead or backward it can be hooked on with equal facility. The condenser used is of Sewell's patent, with tubes packed at both ends.

The Grain Trade of Chicago.

The Chicago *Western Railroad Gazette* says:—"When we consider the condition of other Western cities in a financial and business point, it is with satisfaction that we present the following figures which exhibit a very respectable increase in the produce trade over last year. The total receipts of all kinds of grain, from January, 1861, up to Nov. 30, were 51,026,917 bushels, showing an increase of 15,264,631 bushels over the total receipts of the entire year, 1860. The excess of receipts over shipments, thus for the present year, is 5,265,247 bushels. Although lake navigation for the season is closed, there will be heavy shipments by railroad—probably 500,000 bushels of grain of all kinds, and flour."

CALIFORNIA WOOLEN MANUFACTURES—SEWING MACHINES—SUGAR GRASSES—GRAIN CLEANERS.

California is provided with many great natural advantages, and to these her citizens are now adding the useful arts. Beside gold and silver for supplying our currency, she exports grain and wool in large quantities. Of the latter product about four million pounds have been raised during the present year, and appearances afford indications of the state becoming largely engaged in the manufacture of woolen fabrics. Its pasturage and climate are well adapted for sheep raising, and a plentiful supply of cheap wool is certainly a strong inducement to the inhabitants to engage in the manufacture at home, rather than export the wool in the raw state, and import it again in the form of cloth. Already one woolen factory has been established at the Mission, near San Francisco, in which good cloth, blankets, shawls, flannels and tweeds are manufactured, and the demand for these home-made fabrics has been so great that the owners of the factory have been compelled to run the mill day and night, with two separate gangs of a hundred operatives in each. The cloth is also made into garments by the company, who use sixty of the Wheeler & Wilson sewing machines, and thus combine a clothing with a manufacturing establishment. About 4,000 lbs. of wool are consumed daily in the mill, and it seems to be but the pioneer of many similar establishments in the great Pacific State.

To her other natural products California has lately added petroleum oils obtained from surface wells in the Lower Mattole valley. The supply has been very limited, but the region affords indications of large stores being obtained by deep boring, as in Western Pennsylvania, and it may be furnished in sufficient abundance to be used for fuel as well as light.

In the beautiful region skirting the Sierra Nevada there are several small tribes of Indians who are gentle in manners and devoted to rural pursuits. These Indians cultivate a peculiar white root which grows like the onion, but when roasted it looks and tastes like a yam, and is very palatable and nutritious. Its cultivation may be extended to other countries, and it is likely to become a substitute for the potato, which is so unreliable as a crop. In this region there is also a certain natural sweet grass, from which the natives press the juice and boil it down into sugar and molasses. Properly cultivated, this grass may yet furnish the State with all the sugar it requires.

We have some advice to give to California farmers about preparing their wheat for market. As a general rule, most of that which has been exported has not been properly or even half cleaned. It contains a great amount of chess, smut and oats, and on this account it has sold at comparatively low prices. With good grain-cleaning machines, which can be had in abundance in the Atlantic States, their wheat can be cleaned in such a superior manner that it will sell at prices varying from twenty-five to thirty per cent higher than now realized. There is an old and true saying respecting a careless farmer, "he leaps over sheaves gathering straws." This is really applicable to every one who can and does not use the very best machines that can possibly be purchased for every purpose required. By patronizing inventions, manufactures and improved mechanism, California will soon become second to no State in all useful productions, both natural and artificial.

British Newspapers.

Since the tax on newspapers was repealed in England, their number has increased "at a prodigious rate. From late statistics we learn there are 210 newspapers of all descriptions, published in London and the metropolitan districts. Of these twenty are published daily; five of them being devoted exclusively to commercial and shipping affairs. Of the religious class, nine are conservative, advocating the opinions of the Church of England; seven are liberals, and advocate the various opinions of dissenters; and four defend the Roman Catholic creed. Seventeen journals are exclusively dedicated to various branches of commerce; nine papers attend to the concerns of railways, engineering, mining, and building. Agriculture is attended to by eight papers; and the turf, the prize ring, and what the French term *Le Sport*, by seven. Law supports four journals, and medicine the same number. Rifle volunteers and military subjects in general, are attended to by six. Musical matters and the theater each occupy two journals. Three weekly papers criticise new books. The pawnbrokers and the police have each one journal; court and fashionable matters have two.

In the thirty-nine counties of England (excluding Middlesex) there are about 580 journals, published at various prices, ranging from 1d. to 5d., nearly one-half the number being sold at 1d.; 230 of these support liberal political and religious views; 110 are conservative, or liberal conservative; 47 call themselves independent, and 193 are avowedly neutral.

The increase in the number of newspapers within the last twenty years may be counted by hundreds, and the circulation by hundreds of thousands. One of the penny dailies has a circulation of seventy thousand, and one of the cheap weekly more than three times as many. The political influence of a newspaper is not always in proportion to its circulation. The *Times* does not circulate sixty thousand copies daily, yet its influence, both on government and throughout the country, is incomparably greater than that of any other journal.

Wales publishes 32 papers; 28 printed in English 4 in Welsh; of these, one-third is liberal, another third neutral, and the remainder various shades.

Scotland publishes 160 papers; of which 90 are liberal, 17 conservative, 14½ independent, and the remainder style themselves neutral.

Ireland numbers 138 newspapers; of which 38 are liberal and 38 conservative, 11 independent, and the remainder neutral.

There are 32 papers published in the Isle of Man, and the Channel Islands.

The brief summary is 1,142 in number; of which 464 are liberal papers, 190 conservative and liberal conservative, 83 independent, and the remainder, neutral.

Manufacturing News.

The Social and Harrison Mills at Woonsocket, R. I., are running full time, and have a supply of cotton on hand sufficient to last till May next. The woolen mill of E. Harris, same place, is running part of the time day and night, and full time constantly. Several of the cotton mills in Woonsocket, however, are only running on three-fourth time.

S. and E. A. Abbott, of Concord, N. H., are engaged upon contracts of wagons and ambulances for the army, and employ 500 men

The Cincinnati *Commercial* states that there are 25,000 persons in that city employed in the manufacture of clothing, camp equipage, and equipments of various kinds for the army. Over 2,000 women and girls are engaged in making tents, of which 11,000 have already been constructed. No less than 2,500 persons are engaged in manufacturing army wagons in Cincinnati.

The Holyoke (Mass.) Machine shop is running extra hours in making gun machinery for the Springfield Armory.

The mill of Elisha Jenks, Adams, Mass., which has been idle for several months, recently commenced running full time, with a supply of cotton for the winter.

BESSEMER STEEL FOR GUNS.—The London *Engineer* says:—Far better than the system of construction pursued by Sir William Armstrong would be the casting of a homogeneous gun from mild steel, uniting, as it necessarily would, all the resistance of cast iron to crushing, with nearly twice the tensile strength of wrought iron. Before Sir William's elevation to his present post, Colonel Eardley Wilmot had arranged for the erection of apparatus at Woolwich, for the production of gun blocks, of the material in question, at £7 10s. per tun. Had not Colonel Wilmot been summarily and most ungraciously superseded, we should, in all probability, have now had thousands of guns capable of bearing any proof, and at hardly one-fifth the cost of those upon which, while yet experimenting, and in doubt, we are expending millions of money.

RECENT AMERICAN INVENTIONS.

Thermometers.—The principal feature of this invention, patented by M. A. Finnell, of New York city, consists in the use of printed scales made of card, Bristol board, or pasteboard. In order to obtain a correct scale to suit any tube, a large number of scales increasing in length by almost imperceptible gradations, are provided, and on the tube being marked to show the range of the mercury between two given points of temperature, a positively correct scale may be found to suit it. By this method of adapting the tube and scales six-sevenths of the labor consumed in the manufacture of thermometers is saved, every scale having heretofore been divided and engraved to suit its particular tube. The printed scale may be made exceedingly ornamental. Another feature of the invention consists in bending the tube close to the bulb to throw it (the bulb) forward so that the tube may lie close against the scale without providing a hole in the latter for the bulb. Another improvement consists in cementing the tubes to the scales and so dispensing with bands.

Hotel Annunciators.—The object of this invention is to obtain an annunciator for hotels by which the occupant of a room may make known his want at one and the same time that the bell is rung for the clerk or waiter, thereby saving the time now expended by the waiter in going to the room of the occupant in order to ascertain what is wanted. The invention consists in the employment or use of certain mechanism so arranged and connected with a knob, that as the latter is pulled or actuated by the occupant of the room, a bell will be sounded and a slide moved, the latter indicating the article desired by the occupant. This device is the invention of J. H. H. Bennett, of Hunt's Hollow, N. Y.

Beer Cooler—This invention relates to a new and improved apparatus for cooling wort in the process of brewing, and has for its object the perfect straining of the wort after leaving the boiler and previous to its distribution over the cooling tubes. The invention was patented by John Trageser, of New York city. It has further for its object a more perfect distribution than usual of the wort over the cooling tubes so that it may be cooled rapidly, without waste by splashing, and be made to enter the fermenting or "gyle" tun in the best possibe condition for the subsequent process of fermenting. The invention consists in the employment or use of a horizontal tube which receives the wort from the boiler, and is perforated chiefly at its upper surface, fitted within a suitable vessel having a perforated bottom and provided at its under side with suitable flanches, which are directly over the upper cooling tube, whereby the desired result is attained.

Heddle Varnishing Machine.—This invention consists in the employment of rollers for applying the varnish and rolling it into the heddles; also to the use, in combination with such rollers, of a system of reciprocating brushes for brushing off the superfluous varnish from and laying down the fibers of the threads of which the heddles are composed; also to certain means of holding the frames containing the heddles during the brushing operation; and further, to a certain arrangement of the several parts of the machine with respect to each other for convenient operation. By this machine one man can easily varnish one hundred sets of harness per day, wasting no varnish and making much smoother and in every respect better work than can be done by hand. It is the invention of John L. Lairdieson, of Troy, N. Y.

Mode of Setting Stills, &c.—The object of this invention, by W. Howland, Jr., of New Bedford, Mass., is to obtain a uniform heat under all parts of the bottom of a still, retort or kettle, and to this end it consists in the arrangement near the outer edge of the bottom of a still, retort or kettle, of a series of diving flues communicating with a flue which runs all round the setting, at, below or near the level of the fire chamber, and connects with the main flue.

Saddle.—The object of this invention is to assist the learner to acquire a correct position in riding and to give skilled and unskilled equestrians a more secure, easy and graceful seat than is attainable with saddles in common use. Patented by R. N. Eagle, of the United States Army.

In Madras the wooden sleepers of railways decay so rapidly that iron has been substituted for them.

Restoring Old Books by Ozone.

We find the following in the Paris correspondence of the *Photographic News*:—

Ozone has been suggested by Gorup-Besanez as an effective and convenient agent, when properly applied for restoring books or prints which have become brown by age, or been smeared or soiled with coloring matter, only a short time being required to render them perfectly white, as if just from the press; and this without injuring in the least the blackness of the printing ink, or the lines of the crayon drawings.

As examples of his results, the author mentions a book of the sixteenth century, upon a page of which several sentences had been painted over by the monks of that epoch, with a black, shining material, so as to render them illegible, and of which no trace of a line could be detected. After 36 hours' treatment with ozone, the coloring matter was entirely removed and the most careful scrutiny of the page failed to discover that any of the lines had ever been painted over. In like manner, a wood cut after Albert Durer, which had been smeared with a dark yellow color, was completely restored to its original whiteness.

Writing ink may be readily discharged by ozone, especially if the paper be subsequently treated with very dilute hydrochloric acid, to remove the oxide of iron.

Printing ink is not attacked by ozone to any extent unless the action be long continued. Vegetable coloring matters are completely removed by it; but metallic coloring matters, grease spots, and stains produced by fungi, cannot be obliterated.

As applied in the small way, the method consists in placing a bit of phosphorus about three inches in length, and half-an-inch in diameter, the surface of which has been scraped bright in a wide-necked glass carboy, or other large hollow vessel, pouring about as much water, at about 86° Fah., as will half cover the phosphorus, closing the vessel with a cork, and allowing the whole to stand until the jar is charged as strongly as possible with ozone, which usually occurs after 12 or 18 hours. Then, without removing the phosphorus or the water, the paper intended to be bleached, previously moistened with water, rolled up and suitably attached to a platinum wire, is hung in the middle of the vessel. The cork is then replaced, and the apparatus is left to itself. The roll of paper is soon surrounded with the fumes arising from the phosphorus, and the stains gradually disappear. The rapidity of the operation of course depends upon the nature of the substance to be discharged—three days being the longest time required in any of the experiments. Prints which had merely become brown by age, and others stained with coffee, usually become perfectly white and clean in the course of 48 hours. The action of the ozone, however, must not be continued too long, lest some of the finer lines of the engraving should be injured. After all the spots have disappeared, the paper is strongly acid, and if allowed to dry when in this condition, would become exceedingly brittle, and also dark colored. It is consequently necessary to remove the acid completely. In order to accomplish this, the paper is placed in water which is frequently renewed, and allowed to lie there until a bit of blue litmus paper pressed against it is no longer reddened. The paper is then passed through water to which a few drops of solution of soda have been added, and is spread upon a glass plate, this is slightly inclined, and a fine stream of water is allowed to flow over the paper during 24 hours. After the paper upon exposure to the air, has become dry enough to be removed from the glass without risk of tearing, it is taken off, and pressed dry between folds of bibulous paper.

Enormous Contract for Locomotives in France.—The Creuzot locomotive building establishment is executing an order for sixty-one engines (fifty-one of them being intended for goods' traffic) for the Madrid Saragossa and Alicante Railway, the leading enterprise of the kind in Spain. Of the new engines twenty-one are to be delivered in the current year, thirty next year, and the remaining ten in 1863. By the end of 1863 it is expected that the company will have 242 engines and 602 carriages, beside 3,000 trucks.

The returns for 1,233 cotton mills in Lancashire, England, show a diminution of 34 per cent of operatives within the past two months.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING DECEMBER 17, 1861.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.

2,920.—W. S. G. Baker, of Baltimore, Md., for an Improved Camp Bed:

I claim the jointed frame work, W W, in combination with the jointed lower pieces, r r, so constructed as to form frames for an upper and lower bed, which are supported by a hinged diagonal brace, in such a manner that the lower frame can be disconnected, and the whole folded up together, substantially as and for the purpose specified.

2,921.—B. G. Barney, of Philadelphia, Pa., for Improvement in Fastenings for Shoulder Straps:

I claim the projecting lips, e and e', on the under side of the shoulder strap, A, in combination with the strips, D and D', attached to the shoulder of the coat, the whole being constructed and arranged substantially as set forth, for the ready attachment of the strap to, and its ready detachment from the coat, in the manner specified.

2,922.—J. H. H. Bennett, of Hunt's Hollow, N. Y., for an Improved Hotel Annunciator:

I claim the arrangement of the plates, e, slide, C, having the plate, D, attached, which is provided with a pin, d, and connected with the drum, E, or other spring, the slide, L, of the knob, M, the bell, I, and the slides, F, substantially as and for the purpose set forth.

2,923.—David Denham, of Virden, Ill., for an Improved Portable Field Fence:

I claim the combination of the horizontal rails, A, cross pieces, B, oblique braces, C, projecting ends, a a, supports, D E E', mortises, I gains 2, and keys, F, all constructed, arranged and employed in the manner and for the purposes specified.

[The above fence possesses in a high degree the qualities of strength, lightness, cheapness and durability, and may be set up and taken down, or a panel removed in any part with great rapidity, or the whole fence may be conveyed from place to place as easily as an equal quantity of lumber.]

2,924.—J. H. Dennis, of Louisville, Ky., for an Improved Mode of Collecting Fares on Street Railroad Cars:

I claim the combination of the platformless rear with a door for exit only, the entrance platform and door in front, the strap, C, and fare box, E, all as explained, as and for the purposes set forth.

[By this invention all passengers, on entering the car, are compelled to pass the driver, so that he is enabled, without inconvenience, to act also as conductor.]

2,925.—Watson Duchemin, of Charlotte Town, Prince Edward's Island, for an Improved Hoisting Block:

I claim a hoisting block, having a loose metal ring, C, which takes the place of the sheave, in combination with the central bearing, e, and the friction rolls, m, operating substantially as specified.

2,926.—R. N. Eagle, of the United States Army, for Improvent in Stirrups and their Covers:

I claim, first, The locating of the point of suspension inside or toward the horse or form, a vertical line which is drawn from near the center of, and at right angles to the tread of the stirrup, substantially as set forth.

Second, In making this inclination adjustable by the sliding hub or its equivalent, so as to suit the different circumstances under which it may be used, or the conformation of the user, substantially as described.

Third, The peculiar angular construction of the eye and hub combined, and the manner of their attachment to the body of the stirrup, so as to impart to the tread of said stirrup an angular position horizontally, and also with reference to the body of the horse, thus allowing an easy entrance to the foot, without twisting the stirrup leather, and causing, at the same time, the foot to move in the proper directions, substantially as set forth.

Fourth, Hanging the stirrup upon the horizontal, or nearly horizontal axis, which passes angularly over the tread, in the direction of a line drawn horizontally from the little toe to the instep, substantially as set forth.

Fifth, Constructing the sides or arms of a stirrup in a spiral form, with the inner side or arm shorter than the outer side or arm, so as to compel the toes and foot of the rider to turn inward toward the body of the horse, substantially as described.

Sixth, Constructing the tread or marginal base of the stirrup with an irregular concavity, in order to conform to the bend of the foot or boot, and with the front of said marginal base of the tread higher relatively than the base at the entrance of the stirrup, as and for the purposes described.

Seventh, The cover of the stirrup as described, said cover being made of one piece, the lower portion being turned inward from the bottom to cover the tread, and lower part of sides, thus forming a guard and protection for the foot, substantially as set forth.

2,927.—R. S. Eddy and A. O. Miles, of Nashua, N. H., for Improvement in Locks:

We claim the combination of the tumblers, D, frames, c g, and slotted and notched slides, d e f, when constructed, arranged and operating in connection with a bolt, E a, and key, E b, all as shown and described, and for the purposes explained.

[The object of this invention is to obtain a lock of simple and economical construction which will be burglar poof, and capable of being changed or having its tumblers so adjusted that different keys will be required to open it on a different adjustment of the bits of the same It consists in having the tumblers of the lock formed each of two parts, so that the tumblers may, with the greatest facility, be adjusted to effect the changes. It also consists in a peculiar construction of the key, whereby the bits of the same may be adjusted to correspond with the different positions or changes of the tumblers.]

2,928.—W. H. Elliott, of Plattsburgh, N. Y., for Improvement in the Base Pin and Rammer of Revolving Pistols:

I claim, first, So constructing and arranging the base pin, e, and lever, d, in relation to each other and to the barrel that the base pin may be drawn out in front without first displacing the lever or any portion of the frame, when these devices are employed with a hammer, which is located in the center of the frame, in the rear of the cylinder, as set forth.

Second, Providing a groove, n, in lever, d, so as to afford space for the reception of the base pin, e, as it is passed forward out of the cylinder, as and for the purpose specified.

Third, Cutting away the projecting portions of the head of the base pin, as represented at v v, when the base pin, so formed, is employed with a grooved lever, d, as and for the purpose set forth.

2,929.—Philo S. Felter, of Cincinnatus, N. Y., for Improvement in Guard Attachment for Locks:

I claim the bar or guard, D, provided with the recess, a, in connection with the notched disks, G, spring, F, provided with the projections, b d d, and the key, H, arranged substantially as and for the purpose set forth.

[The object of this invention is to obtain a simple and efficient mech-

anism, by which the keyhole of a lock may be guarded so as to prevent the admission of a key when the lock is in a locked state, and thereby preclude the possibility of the lock being accessible so as to render picking or the obtaining of impressions to make a key being used as a means to unlock the lock.]

2,930.—Joseph W. Ellis, M. D., of Augusta, Maine, for Improvement in Tent Ventilator :

I claim suspending the open upper end of the tapering body, A, of my improved tent, to a shoulder near the upper end of the tent pole, D, by means of the perforated collar, g, and the ropes, p p, but this I only claim when the expanded and conically-shaped tent cap, C, is used for the purpose of closing the open upper end of the said body of the tent, and when the shoulder upon the pole, D, is located in such a position that the upper end of said pole will support the said tent cap, C, in substantially the same relative position as represented.

I also claim passing the tent cap guy ropes, h h, through a series of eyelet holes, in the upper portion of the body of the tent, to the belaying buttons, i i, that are secured to the sides of the tent pole, D, for the purpose of enabling the said tent cap to be confined to any desired position, for the purposes set forth.

2,931.—M. A. Finnell, M. D., of New York City, for Improvement in Thermometers :

I claim the employment of card, bristol or pasteboard, as the material for printed thermometer scales, as and for the purposes set forth.

I claim securing the tube to such scales by cementation, as set forth.

I claim, in combination with tubes thus secured, the bend near the bulb, as set forth.

Finally, I claim, in combination with said printed thermometer scales, the described method of adapting the thermometer tubes to their appropriate ranges of indication.

2,932.—Elisha Fitzgerald, of New York City, for Improvement in Pumps :

I claim, in combination with the division pump, A B C, using for the pump, D, the two valves, F and G, as described, and for the purposes set forth.

2,933.—H. C. Foote, of Jersey City, N. J., for an Improved Portable Farm Fence :

I claim the manner substantially as described of constructing the panels of an open farm fence, whereby the panels can be doubled at will, so as to form closed frames with a rain-proof lap surface, for the purposes set forth.

2,934.—N. S. Gilbert, of Lockport, N. Y., for an Improved Preserve Jar :

I claim the combination of the ball, D, with its wedge-like projections, b b, the stopper, A, with its elliptical button and the mouth of the jar, as specified, the whole being arranged as and for the purpose set forth.

2,935.—S. R. Going, of Brooklyn, N. Y., for an Improvement in Skates :

I claim, first, Supporting the hollow of the foot by fitting the stock, A, to the shape of the boot or shoe, as set forth.

Second, Attaching a plate or spring, G, to the stock, A, to answer the purposes described.

Third, Joining straps, C and D, at E, in combination with bed plate, A, as set forth.

2,936.—W. O. Grover, of Boston, Mass., for Improvement in Sewing Machines :

I claim the combination of two eyes, with an edge piece and a fork, operating on the thread on the down stroke of the needle, the whole constituting a contrivance, operating substantially in the manner set forth, and performing the offices specified.

2,937.—T. C. Hargraves, of Schenectady, N. Y., for Improvement in Cutting Apparatus fo Harvesters :

I claim the combination of the two reciprocating-toothed cutters, A A′, recessed fingers, C c, set screws, f f, guard, g, and plate, h, all constructed, arranged and operating in the manner and for the purposes shown and explained.

[The object of this invention is to obtain a simple and efficient cutting device for grain and grass harvesters, that cannot choke or clog, and one that will be extremely durable, and operate with less power than those of usual construction.]

2,938.—J. V. Harter, of Plymouth, Ill., for an Improved Evaporating Pan for Saccharine Juices :

I claim the follower, D, provided with friction rollers, c d, springs, f g, shoe, e, and covering,), with pan, A, and flanges, a b, when combined, arranged and operating in the manner and for the purpose described.

[This invention consists in an arrangement for preventing decomposition or carbonization of the sirup from too great heat while being evaporated in an open pan over a naked fire.]

2,939.—H. L. Hopkins, of Lebanon, N. Y., for Improvement in Harvesters :

I claim, first, Combining with the frame of a harvester, a finger bar, which may be turned horizontally upon its pivoted connection from one side of the frame to the opposite side, substantially as described.

Second, Combining with said finger bar an elevating and supporting apparatus, so arranged as to perform the same service whether the finger bar projects to the right or left of the main frame, substantially as represented and described.

Third, In combination with a finger bar having its connection with the frame of the machine, substantially as described, a hinged driver's seat, and a reversible tongue, cooperating together, whereby the machine may, at pleasure, be drawn in either direction, substantially as described.

2,940.—Obadiah Hopkins, of New York City, for Improvement in Mounting and Maneuvering Cannon :

I claim mounting two guns and their carriages upon a balanced frame, so constructed and arranged that they may alternately be elevated and depressed above and below a parapet and brought into a safe position to be loaded and discharged, in the manner specified and for the purposes set forth.

2,941.—Daniel Hughes, of Rochester, N. Y., for Improvement in Lamps :

I claim the air chamber between the conductor and the body of the amp, as recited, the gauze-covered holes or small perforations as the inlets for the air, and the globe shade, as they are arranged in relation to each other, and for the purposes set forth.

2,942.—C. W. Irwin, of St. Louis, Mo., for an Improved Camp Chest :

I claim the arrangement of the grooved cleats on the bottom of the chest and the compartments and sub-compartments, in the inside thereof, the whole in respect to each other, substantially as and for the purpose set forth.

2,943.—Charles Kaiser, of New York City, for Improvement in Machines for Polishing the Eyes of Needles :

I claim, first, Arranging the wires upon which the needles are strung, upon a frame, to which may be imparted either a revolving or reciprocating motion, in such manner that the needles will be forced by gravitation to slide longitudinally upon said wires, substantially as described.

Second, In combination with the foregoing I claim, by the interposition of suitable mechanical obstructions, arresting the needles in their attempted revolution around the wire, and retaining them for a portion of the time with their long ends upward, in order that during such period of time that side of the eye of the needle which is nearest the long end may, by coming in contact with the wire, and having the weight of the needle superimposed upon it, be polished equally with the other side of the eye, substantially as described.

2,944.—J. L. Lairdieson, of Troy, N. Y., for an Apparatus for Varnishing Loom Heddles :

I claim, first, The employment, for applying the varnish in the varnishing of heddles, of a pair of rolls operating on opposite sides of the heddles to roll the varnish into the threads, substantially as specified.

Second, The employment, in combination with the varnishing rolls, of a system of reciprocating brushes operating on opposite sides of the heddles, substantially as specified.

Third, The employment, in combination with the rollers, a a, and blocks, p, or other equivalent supports, of a pair of eccentric clamps, N N, and a hook, P, applied to operate in combination with each other upon the frames, B, and connecting hooks of the heddle rails, substantially as set forth.

Fourth, Combining the upper roller, E′, with the brush operating mechanism in such manner that the said roller may have a rotary motion imparted to it when the brushes are in operation, substantially as described.

Fifth, The arrangement of the varnish rollers, the reciprocating brushes and operating mechanism and the rollers, a a, or equivalent horizontal supports for the heddle frames, substantially as specified.

2,945.—Marcus Lane, of Washington, D. C., for an Improvement in Process of Making Iron and Steel :

First, I claim broadly the simultaneous applications of agents other than decarbonizing agent for the purpose of refining and carbonizing metals, which shall act simultaneously not only to carry off the impurities in the metal in the condition of gases, but also the impurities of the metal in the condition of slag.

Second, I claim broadly the simultaneous use of a carbonizing and decarbonizing agent in treating fused metals, which shall act to delay the final decarbonizing of the metal to a time at which the impurities shall have been removed by the agents employed.

Third, I claim the introduction of carbon at a point above the surface of a mass of fused metal, while the metal is in rotary motion.

Fourth, I claim the introduction of the gases from a refining furnace into the stack of a smelting furnace, in such position and in an inflamed state, as to assist in fusing the ore by being passed into the smelting furnace in immediate contact with the ore.

Fifth, I claim causing the gases evolved from the fused metal, and which have accumulated in the refining chamber, to be forced into and among the fusing metal in the smelting furnace.

Sixth, I claim the introduction of carbonate of soda, and the alkalies at a point below the surface of the fused metal in a refining chamber while the metal is in a rotary motion.

2,946.—W. A. Lighthall, of New York City, for an Improvd Method of Setting Tubes for Condensers :

I claim the use of the packing ring, C, constructed and applied as described, in combination with the tube, D, and head sheet, A, as and for the purpose set forth.

2,947.—W. A. Lighthall, of New York City, for an Improvement in Condenser for Steam Engines :

I claim the use of a combined jet and surfaced condenser, constructed and operated substantially as set forth and for the purpose described.

2,948.—W. A. Lighthall, of New York City, for an Improved Steam Condenser :

I claim the combination of the drip plate, J, drip reservoir, K, tubes, E, and division plates, G, with the case, A, arranged and operated as and for the purpose set forth.

2,949.—Henry Lowe, of Baltimore, Md., for an Improvement in Process of Recovering Soda used in the Manufacture of Paper Stock :

I claim reclaiming the soda from the spent solution of caustic soda after its action upon reeds, straw or other fibrous material, by charging the solution with carbonic acid gas in a suitable vessel, so that the organic matter will be precipitated.

2,950.—Archibald McGuffie, of Rochester, N. Y., for an Improvement in Construction of Bridges :

I claim the combination of the angular tenoned heads, b, with the tubular-arched section, a, in the manner shown and described.

I claim, also, The arrangement with the heads, b, and sections, a, of the rods, e, forked rods, C, sleepers, D, bars, F, rods, G g H, and bars, I, as shown and described.

[This invention relates to an improvement in that class of bridges in which the suspension and arch bridges are combined, and consists in a novel manner of forming the arches, bracing the same and suspending the flooring therefrom, as fully shown and described.]

2,951.—Joshua Merrill, of Boston, Mass., for an Improvement in Construction of Stills and Still Bottoms :

I claim the formed seamless steel still bottom in combination with the body of a still, substantially as described.

2,952.—Lewis and Jacob Miller, of Canton, Ohio, for an Improvement in Grain Cleaners :

We claim, first, Suspending the shoe of a grain cleaning machine to the frame by means of straps that are hinged at one of their ends and have a springing motion at the other end thereof, for producing a regular but noiseless motion to the shoe, substantially as described.

We also claim, in combination with a shoe suspended by straps that are hinged at one end, and have a spring motion at the other end, a spring pitman for vibrating said shoe without sudden jar or noise, substantially as described.

We also claim the adjustable wind boards, K L, the latter having a lip or flange, e, constructed and operating substantially as described and for the purpose set forth.

We also claim hanging the front of the riddle in adjustable bearings, so that it may be moved to or from the grain-directing board, N, for the purpose of regulating the blast with regard to that end of the riddle, substantially as described.

2,953.—James Millholland, of Reading, Pa., for an Improved Mode of Operating Giffard's Injector :

I claim operating the perforated tube and internal rod of a Giffard injector by levers, N and M, arranged substantially as described, the said levers being provided with the appliances described, or their equivalents, so that they can be operated together or independently of each other, as set forth.

2,954.—G. W. Moffit, of Washington, Pa., for an Improvement in Car Coupling :

I claim the application of a wrought-iron link, A, a hook or catch, B, and an abutment, F, with a drop-piece, f, to a buffing draw head of a car, so that when two cars, to which the the same are respectively applied, are run into contact with each other, for the purpose of being coupled, the link of either will interlock with the catch or hook of the other, and thus complete a reliable connection of the said cars, the same being constructed and arranged together to operate substantially in the manner described.

2,955.—R. B. Pullan, of Cumminsville, Ohio, for an Improvement in Tents :

I claim so constructing the center joint in combination with the folding thighs and legs as to produce three different forms of tent, all as described and represented.

I also claim the double parallel coverings, H and I, when the ventilating space between them is made with a free and unobstructed egress at the top, as described and represented.

But I disclaim all modes of ventilating the space between the inner and outer tent, where the current is taken through hollow ventilating tent poles, and all other modes of ventilating such double tents, except where the upper part of said passage is left open, free and unobstructed, as set forth.

2,956.—H. W. Putnam, of Cleveland, Ohio, for an Improved Clothes Wringer :

I claim the described side pieces, B B′ H, constructed as specified, in combination with the cross bar, M, ratchets, C, and cams, D, arranged and operating as and for the purpose set forth.

2,957.—Ferdinand Rochow, of New York City, for an Improvement in Rotary Pumps :

I claim, first, Constructing the inclosing shell or case, A, of an eccentric or irregular curve, such that all lines drawn from its opposite sides and through any one and the same point, O′, in the axis or diameter of such curve but at one side of the center of such axis, shall be of equal length, so that abutments or pistons, v v, of the same length with such axis or diameter, revolving in such shell and passing through a shaft or cylinder having the center of its axis in such point, O′, will always be in contact with the sides of the shell, without the use of any device to vary their length.

Second, The combination of the shell or case, A, when so constructed, with the inclosed shaft or cylinder, B, and its movable solid pistons, v v, arranged in respect to such shell substantially as described.

Third, The application and use of the packing rings, p′ p′, and the elastic packing, q q, in combination with the shaft, B, side pieces, S S, substantially as and for the purposes set forth.

Fourth, The whole machine or apparatus constructed substantially as and for the purposes set forth.

2,958.—W. G. Schmidlin and J. W. Driscoll, of N. Y., for an Improvement in Reflectors for Lamps :

We claim the the employment of the reflectors, d and e, formed as sections of truncated cones or pyramids and flaring away from the flame, substantially as and for the purposes specified.

2,959.—W. A. Shannon, of Washington, D. C., for an Improvement in Fire-Escape Ladders :

What I claim, an improvement in the construction of a sectional ladder with arms or braces, Fig. 2, e e, working freely on the rounds and gravitating to their position after the ladder has been passed freely and unobstructedly through the window, and the side braces, Fig. 1, k k, which are designed to prevent the ladder from being pressed into the lower windows.

2,960.—W. A. Shaw, of Boston, Mass., for Improved Bottle Stopper :

I claim a hollow elastic stopper operating in the manner substantially as described.

2,961.—Wm. J. Stillman, U. S. Consul at Rome, Italy, for Improvement in Rifle Sights :

I claim, first, The employment in rifled or other firearms of a reflecting sight, C, so constructed and arranged as to reflect in the line of sight light from a given direction only, substantially as and for the purpose set forth.

Second, I also claim, in combination with a reflecting surface, C, an adjustable covering or protector, B D, so arranged as to admit of being opened or closed at pleasure, for the purpose above specified.

2,962.—A. Stoler and S. A. Sisson, of Bristol, Pa., for Improvement in Cutting Apparatus for Harvesters :

I claim the bolt, D, when formed with a square shank and conical head, whether with or without the steadying pin at its base, as shown; when used in combination with the finger bar and cutter, in the manner and for the purpose specified.

2,963.—John Trageser, of New York City, for Improvement in Beer Coolers :

I claim, first, A strainer for a wort or beer cooler formed of a tube, A, perforated at its upper part, as shown at a, and used with or without the perforations, b, substantially as and for the purpose set forth.

Second, Providing the vessel, B, in which the tubular strainer, A, is placed with narrow boxes, C C, one or more at its bottom; the boxes having notched edges and arranged in relation with the upper cooling tube, D, to operate as and for the purpose specified.

Third, Having the bottom of the vessel, B, perforated with two rows of holes, d d, when said perforations are used in connection with the boxes, C C, for the purpose set forth.

Fourth, The combination of the tubular strainer, A, vessel, B, with its perforated bottom, the boxes, C C, attached to the under side of the bottom of B and notched as shown, and the cooling tubes, D, all arranged as and for the purpose specified.

2,964.—O. M. Truair, of Mount Morris, N. Y., for Improved Machine for Sizing Broom Corn :

The bed, A, receptacles, J J, rollers, E E′, bands, F F, and slats, b, furnished with projections, with the inclined board, fd, and knife, e, when combined, arranged and operating in the manner substantially as described.

[This invention consists, first, in a device for cutting off the butt ends of broom corn, and, second, in a contrivance for assorting and placing the different lengths in separate receptacles.]

2,965.—James Turner, of Chicago, Ill., for Improved Process of Rendering Lard and Tallow :

I claim, first, Drawing off the fat, as fast as it is rendered, by the pressure of the steam in the tank.

Second, The process described of drawing off the fat as fast as rendered by the use of a steam-tight tank, in combination with a strainer or float, and movable or flexible pipe, substantially as set forth.

Third, The mode of delivering the melted fat by the pressure of the steam in the tank to any part of the building, substantially as set forth.

2,966.—Frederick Teiser, of Danville, Ky., for Improvement in Meridian Instruments :

I claim, in combination with the bar, G, and plates, J J′, the bar, D, and disk, C, operated substantially in the manner and for the purposes set forth.

2,967.—I. F. Brown (assignor to himself and Allen Richards), of New London, Conn., for Improvement in Skirt Supporters :

I claim the two jaws, A A, encompassed by an elastic band or spring, C, when used in combination with a detached fulcrum pin, B, all being arranged as shown and described, to form a new and improved article of manufacture, for the purpose set forth.

[The object of this invention is to obtain a very simple and economical clamp to sustain, hold up or support a lady's skirt and supersede the band now chiefly used for the purpose, thereby enabling a lady to use both hands to hold an umbrella in stormy weather, and also enabling her to have both arms and hands at liberty in skating, while the skirt is held up to be sufficiently protected, equally so as if held by the hand.]

2,968.—Joseph Davis, of East Wilton, N. H., assignor to J. Noone, of Peterborough, N. H., and W. Earl, Jr., of Troy, N. Y., for Improvement in Carding Engines :

I claim the specified arrangement or application of an endless traversing grid or apron, or the mechanical equivalent of either, with the main card cylinder of a carding engine and to operate therewith substantially in the manner and for the purpose as described.

And in combination with the said endless grid or apron and the carding engine or its main card cylinder, I claim the arrangement and combination of an adjustable supporter, F, the same being to operate in manner and for the purposes substantially as set forth.

2,969.—George Goewey, of New York City, assignor to himself and E. S. Marsh, of Morrisiana, N. Y., for Improvement in Churns :

I claim the use or employment of the perforated cylinder, G, in combination with the screw blade or propeller, C, for the purpose of speedily producing butter and preventing it, as formed, being operated upon or agitated by the movement of the yet unconverted milk, substantially as described.

2,970.—E. J. Hall (assignor to himself and E. P. Stimets), of Highgate, Vt., for Improved Spring Caster :

I claim the combination and arrangement with an ordinary caster of the screw shaft, C, the spiral springs, E, adjustable plates, H and I, guide rods, G, substantially as and for the purpose specified.

2,971.—K. H. C. Preston (assignor to E. P. Russell), of Manlius, N. Y., for Improvement in Harvesters :

I claim, first, The tapering shape of the single screw thread, d, which I employ for the purpose of enabling the desired amount of motion to be communicated to the crank shaft, C, substantially as set forth.

When a tapering single screw thread is combined with a shaft, either directly or through the medium of a tube or collar, I also claim acting upon said screw thread by means of a series of pivoted rollers and a driving wheel for carrying the same, substantially as set forth.

When a tapering single screw thread is combined with a shaft, either directly or through the medium of a tube or collar, I also claim acting upon the said screw thread through the medium of a series of tapering pivoted rollers and a suitable driving wheel, substantially in the manner set forth.

RE-ISSUES.

142.—J. H. Landell, of Newark, N. J., for Improvement in Tent Fixtures. Patented June 4, 1861 :

I claim, first, The combination of the conical ferrule with the rings or either of them, in the manner described.

Second, Constructing the tripod which supports the tent pole of a ring of sufficient diameter to receive the ferrule of the lower end of the pole and having legs attached in the manner described.

Third, The combination of the tripod, constructed as described, with the ferrule fitted on the lower ends of the tent pole, in the manner described.

[The nature of this invention and improvement consists in a mode of attracting the legs of the tripod to the tent pole, which provides for an easy repair in case of accident in the field, and the better securing of the tent to the top of the pole.]

143.—Geo. Wood, Jno. King and Wm. Lawrence, of Philadelphia, Pa., assignees of said Wood and King, for Improvement in Dredging Crane. Patented Nov. 9, 1858 :

We claim, first, The two barrels, K K, hung to the shaft, J, in combination with the clutch, M, or its equivalent, the whole being arranged on the deck of a vessel, and operating substantially as set forth, for the purpose specified.

Second, In combination with the aforesaid barrels and clutch, or its equivalent, we claim the posts D and D′, each having a pulley, a, and

a movable jib, E, with pulleys, H and G, arranged in respect to the opposite sides of the vessel, substantially as specified.

Third, The carrier, F, with its pulley, G, and its hollow stem, as arranged, to turn in the socket in the end of the jib, substantially in the manner and for the purpose set forth.

EXTENSION.

5,399.—J. W. Winslow, of Troy, N. Y., for Improvement in Rolling and Compressing Puddlers' Balls. Patented Dec. 18, 1847. Extended Dec. 11, 1861:

I claim the method, substantially as described, of compressing or shingling puddlers' balls or loops of iron into blooms, by the combination of the cam-formed compresser and two or more rollers, substantially as described.

Second, I claim the spring or yielding cheeks for setting up the ends of the blooms in combination with the combined cam-formed compresser and rollers, substantially as described.

And, finally, I claim the feeder and discharging follower in combination with the combined cam-formed compresser and rollers, for the purpose and in the manner described.

PATENTS FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes n the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, exception reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian, Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds n the quickest time and on the most liberal terms.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention, if susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats, in English and German, furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does no limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

Notes and Queries

O. C. H., of Conn.—The best varnish for polished metal is made by dissolving white lac in alcohol, but it will not stand much exposure to the weather. The varnish can be made into good lacquer for brass work, by coloring it with a little turmeric and annatto.

Diamonds for Dressing Mill Stones.—A correspondent in Mechanicstown, Md., wishes to know where he can purchase a diamond for dressing mill stones.

M. B., of Mass.—You will find a very able essay on electro-magnetism in the Encyclopedia of Chemistry, published by H. C. Baird, of Philadelphia. All the features of your magneto-electric machine which are new and useful, are patentable.

A. S., of Pa.—The only way to prevent moisture forming on show windows during winter is to keep them warm. The dew point varies. If windows are kept a little above 60° Fah., they will never get coated with moisture or frost. We believe there is an opening in this direction for some new invention to keep show windows free from moisture in cold weather, by some economical method of applying a current of warm air, heated for convenience with a gas jet which can be turned off and on with facility.

J. B. H., of N. S.—The process of dissolving quartz to which you refer, is with caustic lye under a high steam heat in a peculiar apparatus. The mechanism is patented in the United States.

W. J., N. Y.—A preparation of fresh beef tallow and about ten per cent of beeswax, is the best known to us for covering the belts of machines exposed to the gas of coal fires. A little paraffine added to the mixture will improve it.

E. M. L., of Me.—We have heard it stated, as you have a hundred times, that a blacksmith cannot raise iron to a good welding heat when the sun shines on his forge fire, but this is all "moonshine." You state that a wine glass may be filled up with pins, without causing the water to overflow, and you wish to know the reason why. If you can perform such a feat you are more of a prestidigitator than we are. We cannot fill the glass with pins without the water overflowing.

M. A. W., of N. J.—By each stroke of your piston you raise your cubic foot of water only three feet, and you must consequently be continually raising 33 cubic feet to get them 100 feet high. You may always be sure that there is a fallacy in any perpetual-motion scheme whether you can see it or not.

A. C. B., of Ohio.—In firing red hot shot, a wet oakum wad is used. Shells are loaded by being placed in a sabot—(a French word meaning wooden shoe).

J. M. N., of Mich.—A great many experiments have been made with different kinds of lubricating materials for projectiles of all sizes. One great objection to greasing cannon balls is the sticking of the dirt to them. There are, however, known modes of lubricating expanding projectiles by grease applied in a chamber in the interior and not forced out until the explosion of the charge of powder in the gun takes place, and this application is not liable to the objection above specified.

J. A. C., of C. W.—Copper wire is manufactured by Mr. Cabbel, corner of Fulton and Cliff streets, in this city.

J. R. L., of N. Y.—We never before heard of soap stone dust being proposed as a substitute for grease on griddles in preparing buckwheat pancakes. Soap stone griddles are held to be superior to iron griddles for frying pancakes, but save us from the dust!

G. S., of N. Y.—If you have been using an invention for a number of years, and another party has recently patented the same thing, you are not liable to the patentee for its continued use. You cannot now obtain a patent upon proof showing priority of invention on the ground that you had abandoned the invention to the public. The law limits the public use to two years previous to applying for a patent. You ought to have patented the invention in proper time and no doubt you would have made something out of the patent.

C. H. E., of N. Y.—We are not familiar with any of the operations of the Hard Rubber Co.; therefore we cannot afford you the least aid or comfort with reference to reforming their system of granting licenses. We presume the company considers itself fortunate if parties pay for the right, and the reverse if they do not.

J. A. F., of Wis.—We are not acquainted with any published work on pattern making.

C. K. of C.W.—There is no inherent power in a water-wheel whether large or small; the power is in the falling water. A turbine wheel, two feet in diameter, if it economizes all the power of water on a seven-foot fall is just as efficient as one seven feet in diameter. The average power given out by turbine wheels, we believe, does not exceed 70 per cent. Some have yielded as high as 90 per cent; these are rare cases, and exceed that of good overshot wheels by about 15 per cent.

H. W. B., of N. Y.—If the whiffletree of a wagon is placed above the level of the horse's shoulders, a portion of the weight of the horse will be supported by the forward wheels, thus increasing the friction and requiring greater labor to draw the load. If a cannon, placed upon a railroad car, and pointing backward, is fired with a charge of powder which will impart a velocity to the ball just equal to the velocity of the car, the ball will fall vertically to the earth.

W. P. McKee, of Cincinnati, Ohio—Wishes to learn the address of the firm who manufacture hemmers that are adjustable to three different widths, and is fastened on the fingers of the left hand while the operator sews with the right.

A. F. W., of Pa.—There is a class of Latin nouns that form the plural by changing the singular termination *on* or *um* into *a*. Thus we have singular *phenomenon*, plural *phenomena*; singular *aquarium*, plural *aquaria*; singular *stratum*, plural *strata*.

J. O., of Me.—The "Calcium Light" is the old Drummond with a new name. We do not know what kind of pictures Dr. Thompson used in his lecture. There is no patent for transmitting light through photographic pictures with the magic lantern. Photographic pictures taken on glass and colored, are now used in exhibitions with the magic lantern, and they are very beautiful and attractive.

M. A. K., of Mass.—There is a small, cheap book published by J. Weale, London, on the use of drawing instruments. It can be obtained of J. Wiley, No. 56 Walker Street, or Bailliere & Bros., No. 440, Broadway, this city.

R. C. L., of Ohio.—The Bollman machine manufactured by Grover & Baker, is a capital shuttle machine, but whether it will answer your purpose better than the Wheeler & Wilson machine we are unable to state.

J. S., of Pa.—If a new and better result is produced, a patent is often granted on the combination of two well-known principles.

J. R. L., of Ohio.—The process of charging dough with carbonic acid gas under pressure, was patented several years since by E. Fitzgerald, of this city, but the use of carbonic acid gas for raising bread has never been patented. It has been used from time immemorial in breadmaking. We can furnish you with volumes I. and II., present series SCIENTIFIC AMERICAN, bound and part of Vol. III. in sheets.

T. L. VanD., of N. J—Common pitch applied warm, and common hydraulic cement, are the best, we have been told, for an aquarium.

M. F. W., of Ill.—A solution of alum is a good preparation for raw-hide to render it serviceable for out-door exposure. A friend informed us that the application of beeswax to raw-hide, also enables it to withstand exposure to the weather admirably.

S. B., of Mass.—If I buy of a patentee who has sold one-half of his patent, a right to build and use his machines, could I be held accountable to the owner of the other half? Ans.—No.

J. N. P., of N.Y.—Your inventions are important if you can accomplish by them what you state. We never take any pecuniary interest in inventions, and we cannot therefore accept your "very liberal" proposition. If you can find a party to assist you, we shall be happy to transact your business—at the Patent Office.

I., of R. I.—The Parrott gun is named after its inventor, Mr. R. P. Parrott, of West Point Foundry. It is a cast-iron muzzle loading rifled gun, with a wrought iron reinforce shrunk on, and with its breech made of a separate steel pin, having a screw thread on its exterior and screwed tightly into a female thread provided for it in rear of the bore.

J. W., of Ky.—You can procure a copy of the patent you mention by addressing the Commissioner of Patents at Washington.

A. A. A., of Pa.—For such information as you want respecting Beardslee's electro-plating machine, you had better address him by letter. We cannot answer your inquiry.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, Dec. 24, 1861:—

E. S., of Vt., $25, C. and G., of Pa., $25; N. H. B., of Mass., $10; W. R. N., of N. Y., $50; C. S., of N. Y., $20; A. J. A., of Wis., $15; G. H. S., of Iowa, $20; J. D. C., of Conn., 30; A. B. P., of Cal., $20; I. L., of N. Y., $25; M. W. C., of Cal., $15; J. B., of Ohio, $10; F. W. S., of Pa., $43; J. C., of Mass., $30; S. H. A., of N. Y., $12; W. T., of Mich., $15; T. C. R., of Wis., $30; G. and P., of Ill., $15; J. C., of Conn., $15; A. B. T., of Mich., $25; J. W. E., of Ill., $15; J. J. A., of Conn., $25; E. and W., of N. Y., $25; L. B., of Conn., $15; J. P. E., of Pa., $25; J. R. T., of N. Y., $15; S. I. B. of N. J. $20; E. and R., of N. Y., $20; J. McC., of Wis., $30; J. C. B., of N. Y., $10; G. Mc K., of Ill., $25; J. C., of Mass., $15; G. M., of Conn., $60; T. H. R., •

Vt., $35; B. D. R., of Iowa, $25; J. L., of Mass., $15; B. and B., of N. Y., $15; H. N. H., of Vt., $40; E. G., of Mass., $25; J. J. H., of Ky., $25; S. G. B., of Conn., $30; L. M., of Mich., $45; J. McE., of N. Y., $20; C. and P., of Me., $20; D. L. M., of N. J., $25.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Dec. 18 to Wednesday Dec. 24, 1861:—

L. C., of N. Y.; F. E. B., of N. J.; T. H. R., of Vt.; J. E. B., of N. Y.; J. T. A., of Conn.; E. G., of Mass.; L. B., of Conn.; J. P. E., of Pa.; F. W. S., of Pa.; E. S., of Vt.; A. C., of Mass.; G. McK., of Ill.; J. B., of Ohio; E. & W., of N. Y.; A. B. P., of Cal.; I. L., of N. Y.; H. H. W., of N. Y.; K. & A., of Pa.; D. L. M., of N. J.; S. H. A., of N. Y.; C. & G., of Pa.; G. H. J., of Iowa; B. D. R., of Iowa; J. J. H., of Ohio; E. B. T., of Vt.

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NEW YORK OBSERVER FOR 1862.—IN ASKING the aid of all who may desire to extend the circulation of the *New York Observer*, it is proper for us to state distinctly the position it occupies with reference to the present condition of public affairs in our beloved country.

Having always maintained the duty of good citizens in all parts of the land to stand by the Constitution, in its spirit and letter, when that Constitution was assailed and its overthrow attempted, we accordingly at once gave a cordial support to the Government in its patriotic endeavor to assert its lawful authority over the whole land. Believing secession to be rebellion, and when attempted, as in this case, without adequate reasons, to be the highest crime, we hold

1. That the war was forced upon us by the unjustifiable rebellion of the seceding States.

2. That the Government, as the ordinance of God, must put down rebellion and uphold the Constitution in its integrity.

3. That every citizen is bound to support the Government under which he lives, in the struggle to reestablish its authority over the whole country.

4. That the Constitution of the United States is the supreme law of the Government as well as of the people; that the war should be prosecuted solely to uphold the Constitution and in strict subordination to its provisions; and the war should be arrested, and peace concluded, just so soon as the people, now in revolt will lay down their arms and submit to the Constitution and laws of the land.

The distinctive features of the *Observer* are,

1. It is printed on a double sheet, so as to make two complete newspapers, one devoted to secular and the other religious matters; and these may be separated so as to make two complete journals, while the price for both is no greater than is charged for many papers smaller than either one of the two.

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ICE HOUSES AND STORING ICE.

It is not too late to build an ice house for laying in a supply of ice during the present winter. The best situation for an ice house is a northern exposure shaded on the south by a hill or a building. It should be erected on the top of the ground in preference to the old plan of excavating on a hill side. The ground for it should be prepared by digging a drain about two feet deep to run through the center, and then filling in the space intended for the floor about a foot deep with broken stones and gravel, and over this the plank floor of the house should be laid. It should be laid on joists secured in the sills of the frame. The sides should be double, with a space between the inside and outside planking of about from four to six inches. The supports and braces should be strong. A very common exercise of judgment will enable almost any man to select proper timber for the purpose. The roof should also be double and have a considerable slope. The spaces between the double sides and ends and roof may be filled in with dry sawdust, dry spent bark, fine charcoal or straw. The opening for receiving and taking out the ice should be on the north side, and it should have a double door opening outward. In filling the house, clean straw should be spread upon the floor in a layer of several inches. The blocks of ice should be cut as large as possible and packed close together, and no spaces be permitted between them. All the interstices should be rammed down with small pieces of ice and sprinkled with water so as to form an air-tight mass. A space should be left all around the sides to be filled in with several inches of straw. No bottom ventilation should be permitted, but there should be a space left at the top for ventilation by a lattice window.

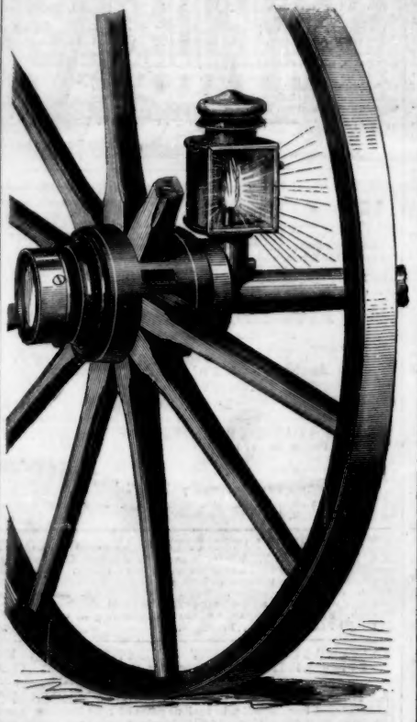
Very cold days should be chosen for filling the ice house. After the blocks are cut and lifted from contact with the water, they should be left for an hour or more exposed to the atmosphere. Ice does not keep so well when run into the ice house direct from the pond, because that which has been in contact with the surface of the water is only a few degrees lower in temperature than the water, whereas the atmosphere may be twenty or more degrees lower. Clear solid ice should be selected. Porous blocks contain air and thaw more readily than solid ones. When the house is filled the top of the ice should be covered with about three inches of straw, and when ice is taken out in warm weather the door should be closed as soon as possible afterward.

An ice house about twelve feet square will keep as much ice as will supply a large family. Every farmer should have an ice house, and where lumber is cheap a small one may be put up at a cost not exceeding thirty dollars.

A MANUFACTORY of army rifles has been commenced by Messrs. Jenks, at Bridesburg, Pa. It is capable of turning out four hundred per week.

Lamp Attachment for Carriages.

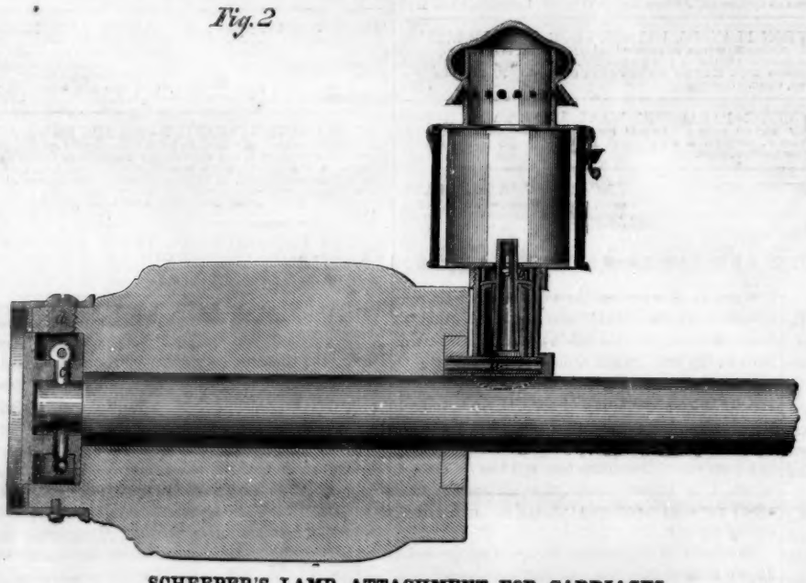
The accompanying engravings represent an invention, patented last week, in which a two-fold object is accomplished. First, in the mode of attaching the



lamp of a carriage to the axle; and, secondly, in making the lamp the reservoir for holding the oil for lubricating the axles.

Fig 1 is a perspective view of the lamp with the hub of the wheel, and Fig. 2 is a vertical section through the lamp, hub and axle. A small metallic

Fig. 2



SCHEEPER'S LAMP ATTACHMENT FOR CARRIAGES.

tube, *a*, leads from the lamp to the shoulder of the axle. This tube is perforated with small holes and is filled with a wick to conduct the oil slowly from the lamp to the axle. The wick for feeding the flame is held from being jarred down by a little spring, *b*.

The wheel is secured upon the axle by a cylindrical lynchpin, *c*, which is inserted by being dropped through a small hole in the hub provided for the purpose. This hole is then closed by a screw, *d*, thus precluding the possibility of any leakage of oil at the outer end of the hub.

For the rear wheels, or where lanterns are not required, a simple reservoir of oil instead of the lamp, is placed upon the axle. By this position of the lantern the light is thrown forward by the side of the horses and into the road before the carriage, where it is wanted. The apparatus saves the disagreeable and troublesome labor of greasing the wheels, and it forms an exceedingly neat ornament to the carriage.

The patent for this invention was granted December 3, 1861, and further information in relation to it may be obtained by addressing the inventor at 16 Minetta Lane, New York.

A New Yellow Color.

The London *Photographic News* gives a glowing account of a new yellow color called *aureolin* which, it states, is a chemical compound of as definite a character as nitrate of silver, and which is the nearest approach to an elementary yellow resembling the pure tint of the solar spectrum. It does not state when it was discovered, or how it is made, but asserts that it combines with blues and reds, forming beautiful and permanent greens and purples. If it possesses such qualities it is one of the most valuable discoveries yet made in color-chemistry.

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